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THE BRICKBVILDER

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H. F. B.

THE BRICKBUILDER.

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ADVERTISING.

Advertisers are classified and arranged in the following order: —

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Advertisements will be printed on cover pages only.

THE PROTECTION OF STRUCTURAL STEEL.

WITHIN the last ten years steel has come to be a most important factor in the construction of our commercial buildings. In fact, it is the material upon which nearly all of our reliance is based for the provision of scientific support. The preservation of the steel from corrosion, no less than from fire, has received most careful consideration; but if we are to judge by an article which has recently appeared in *Insurance Engineering*, we have by no means arrived at the final conclusion. The writer, Mr. Frank B. Abbott, offers a statement that structural steel to be imbedded in a wall which is laid up in cement mortar should receive no paint of any description, no surface coating, but should be simply thoroughly cleaned, and every trace of rust removed by cleaning with wire brushes before the metal receives its masonry coating. He claims that the only proper protection for the steel is what is offered by the cement in the masonry; that this cement forms an impervious protection against rust, provided it can attach itself directly to the steel, but that if paint of any description is applied to the steel, it is only a question of time when the paint will entirely disappear, leaving an opportunity for moisture to work in between the cement and the metal. We cannot see, however, that Mr. Abbott has at all proved his point. On the contrary, we have seen abundance of evidence that the right kind of paint is of very great value in protecting the steel, and that the cement on the outside of the paint is certainly in some cases an apparently perfect protection for both the paint and the metal. Some years ago a large building was torn down in New York, from which were taken some wrought-iron beams which were among the first which had been used for structural purposes in this country, having been in position for at least thirty years. It was found that the cement mortar had formed a solid cake about the metal work, and this coating had protected the paint, which in its turn apparently protected the iron. We have seen numerous other instances showing that it is far safer to trust to the protection of properly applied paint than to expect that the careless methods of laying up brick or terra-cotta about a steel frame will insure the deposition of a protective cement coating on the metal.

There is one statement which is constantly encountered which we are always inclined to question, and that is, that unless steel or iron is thoroughly cleaned from scale and rust, the protective coating of paint, or whatever it may be, cannot be depended upon. Our observation leads us to directly contrary results. We have experimented by selecting a wrought-iron water pipe which was entirely covered with thick rust, so that it could be brushed off with the finger. Over that coating of rust we have applied a heavy coat of paint, and have left the pipe exposed to the weather for two winters, at the end of which time we were unable to detect any difference in the amount of rust. While we would by no means argue from this that it is safe to neglect the proper cleaning of structural steel, we cannot help feeling that the real danger from careless painting is not from the presence of scale, or slight amount of rust under the paint, so much as from imperfect application of the paint, or poor composition of the material itself. About all that we really know in regard to the durability of steel in a frame structure is that in some cases it rusts and in some it does not. Experiments and investigations are not conclusive as showing cause or prevention in one case or the other, but in default of any more positive information we certainly shall be very loath to accept Mr. Abbott's conclusions and omit painting entirely.

THE QUALITY OF MODERN BRICKWORK.

COMPARISONS are apt to be invidious, and it is seldom safe to draw conclusions based upon a comparison of the past with the present day. It is a question, however, whether the advent of the steel frame has not, on the whole, resulted in a lowering of the

standard of what is considered good brick masonry. Where the whole structure is supported by a steel skeleton, where the worst that could happen from defective masonry would be the falling out of a few panels, and where the results most apparently desired are good looks and fire protection, it would not be strange if builders no less than workmen, should minimize the value of what we sometimes designate as an honest masonry construction, and should be content with a character of bonding and bricklaying which is by no means up to the ideal standard. Human nature is so constituted that it will acquire bad habits far easier than good ones; and though steel construction has not yet crystallized into a thoroughly coherent system, it has been used long enough to make our workmen careless, and we regret to see every day more instances of it in our modern work. Furthermore, not content with assigning to it the static loads, the engineers have called upon the steel skeleton to resist variable wind pressures, and the tendency of structural designers is to ignore entirely the stiffening effect of a well-built curtain wall between the supports of a steel frame, with a result that the contractor would very naturally feel that it mattered very little how his bricks are laid up, provided the metal is thoroughly protected and the external appearance is preserved. This is surely a mistake; fortunately, it is one which will rectify itself in time. The ideal steel frame building to our mind is one in which the brickwork is laid up in the most thorough manner, so as to not merely inclose, but to thoroughly brace the framework, and to form a most efficient protection against any probable infiltration of water. The building laws in many cities allow the curtain walls of a steel building to be only 12 ins. thick. We are inclined to think that 16 ins. would be far safer, and in the lower stories this ought to be 20 ins; and the high quality of laying which characterizes some of the older work ought to be insisted upon in every case in connection with a steel frame, not merely as an additional safeguard, but because it is an integral part of the stability of the structure.

PROSPECTS.

SOME interesting figures were published in one of the magazines last month, showing the immense strides this country has made during the past ten years, not merely reversing its position from that of a debtor to that of a creditor nation, but, in addition, building up an enormous balance of trade, and adding to its wealth at a rate which borders upon the marvelous. Such financial combinations as now exist in this country are beyond the fables of the past generation, and we have grown accustomed to capitalizations running up into hundreds of millions and backed by solid tangible values. The personal thought suggested by all these figures is what share of all this wealth is coming to the architects, and why haven't we seen more of it. As a matter of fact, the volume of new building is increasing all the time, but it is our conviction that we are only just beginning to realize on our balance of trade, and that it will be at least another year before the accumulations will be distributed in the shape of large building operations. Real estate is the last to feel the good times, as also it is the last to feel the approach of hard times. The twelve months just elapsed have been marked by a large increase in building and a constant raising of the quality of the work, so that architects have had opportunities that were beyond their reach a few years since. But there is every evidence that good times have only just begun. The increase in building operations for February over the corresponding month of a year ago amounts, considering only the principal, large cities, to something over 122 per cent. Some cities, it is true, show a loss. Philadelphia, Washington, Denver, Minneapolis, and Atlanta have all fallen behind, but the gain in Kansas City amounts to 281 per cent., Chicago goes ahead 231 per cent., and from that, the advance drops down by degrees to Indianapolis, which is advanced only .49 of 1 per cent. We find in nearly all the offices a good deal of activity in the preparation of sketches and schemes for large public work, and where there is so much of this evidenced it can be taken as a fair sign that the investing public is looking around for opportunities to place the money reserves which have piled up during our prosperous export years.

"The Brickbuilder" Competition. VIII.

GIVEN BY THE GRUEBY FAIENCE COMPANY, BOSTON.

PROGRAM.

THE design is to be of the ticket windows in the vestibule of a theater, and the immediate treatment about these windows.

There are to be three windows, at a height of about 4 ft. above the floor, and they need not be of equal size. The intention is to obtain a design which, while a decorative motive in character with the surroundings, is complete in itself. All glass used shall be plain, undecorated glass — no stained glass. Grilles to be simple in character, if used. The treatment of the adjacent wall and its relation to the windows is to be indicated. The design is to be such as is adapted to the working out in faience.

DRAWINGS REQUIRED: An elevation drawn to the scale of ½ in. to the foot, with plan at left and section at right side, near the bottom of the sheet. The drawings to be in black ink with no wash work, on one sheet measuring 22 ins. wide by 15 ins. high. Shadows, if indicated, to be done in free hand, parallel perpendicular lines. Drawing is to be signed by a *nom de plume*, or device, and accompanying the same is to be a sealed envelope with the *nom de plume* on the exterior, and containing the true name and address of the contestant.

Drawings are to be delivered, flat, at the office of THE BRICKBUILDER, 85 Water Street, Boston, on or before July 1, 1901.

For the four designs placed first, the Grueby Faience Company offers prizes of fifty, twenty-five, fifteen, and ten dollars, respectively. All premiated drawings are to become the property of the Grueby Company, and the right is reserved to publish any and all drawings submitted.

The competition will be judged by Mr. C. Howard Walker.

Old English Brickwork. I.

BY W. G. HORSEMAN AND HENRY TANNER.

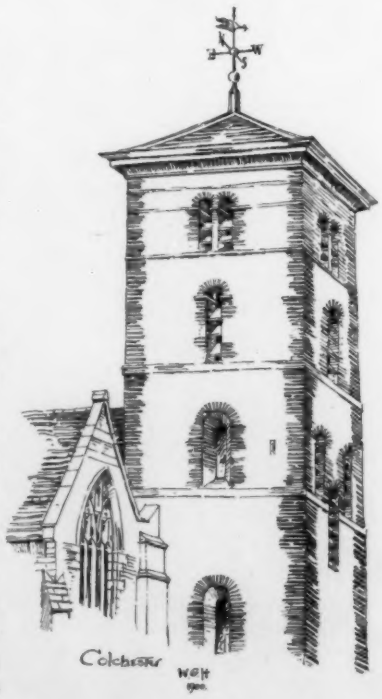
IN writing on the subject of "Brickwork in England," it is necessary to make mention of the very early periods of its use, although these may possibly have an interest more for the antiquary than the architect. So far as can now be ascertained, the Romans were the first to introduce the art of manufacturing and using bricks in this country, and during the period of time which elapsed between their conquest of Britain, A. D. 43, and their final departure about A. D. 418, bricks were very generally used in the construction of the fortified towns and camps, which they founded in various parts of the country.

ST. ALBANS ABBEY TOWER, HERTFORDSHIRE.

There is little doubt but that these towns possessed temples, baths, theaters, houses, etc., upon a scale not far short of those founded in other colonies of the Roman Empire; for instance, the remains of villas at Begnor in Sussex, Great Witcomb in Gloucestershire and Woodchester, exhibit in their plan and arrangement most of the characteristics of those in Italy.

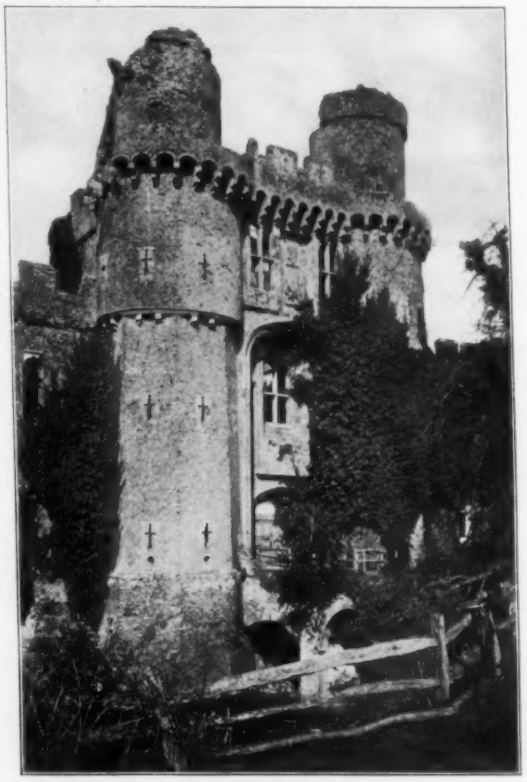
The bricks, or rather wall tiles used in these buildings, vary very considerably in dimensions. Those found at York, Colchester, Verulam, Porchester, and other places measure from between 1 and 2 ft. in length, 8 to 12 ins. in width, and about 1¼ to 2 ins. in depth; and in all cases these bricks are very hard and well burnt.

At Richborough, in Kent, the walls are from 20 to 30 ft. high and about 11 ft. thick, formed of courses of bricks and stones regularly laid. The ancient wall of London is similar in construction; two courses of bricks and then a layer of stones, about 2 ft. in thickness, alternate throughout the height. The art of building must have reached a high stage of perfection, as it is recorded that when the Emperor Constantine rebuilt the city of Autun in Gaul in the third century he brought the workmen chiefly from Britain, which abounded with the best artificers. After the departure of the Romans, it is more than probable that the practice of brickmaking was discontinued for a long time.



CHURCH TOWER AT COLCHESTER, ESSEX.

The Saxons and Normans certainly did use bricks in their buildings, but these are generally believed to be the old Roman wall tiles, or bricks, taken from ruined or existing buildings and reused. That this was done in some places has been satisfactorily proved by finding in Norman buildings some of these old bricks still having the traces of Roman mortar adhering to them.



HURSTMONCEAUX CASTLE, SUSSEX.

In Brixworth Church, Northamptonshire, some arches formed with Roman bricks can still be seen in the walls of the nave, and at Dareul Church, in Kent, similar remains exist.

The Abbey Church of St. Albans, in Hertfordshire, is perhaps the most important building of the Norman period. Begun by Abbot Paul, A. D. 1077, and consecrated in A. D. 1115, it is very largely constructed of Roman bricks, all of which were probably obtained from the adjacent Roman city of Verulam, which was then ruined and deserted for the new city clustering round the church, founded in honor of the martyr Saint Alban. These bricks here used are from 1½ to 2 ins. deep, and the mortar joints are very thick, about 1⅛ to 1¼ ins.

The extremely fine central tower is entirely built of brick, and being fortunately in much the same condition as when completed by its Norman builders, gives a very

GREAT CRESSINGHAM PRIORY.

good idea of what must have been the general external appearance of the Norman church, most of the other portions of which have been refaced at various periods, although the core of the walls is still of brickwork. The whole building was planned upon a vast scale, with nave arcade, triforium, and clearstory. The interior was plastered completely and decorated throughout with mural painting, some remains of which still exist.

Two other churches, also at St. Albans, present examples of Roman brick used anew. St. Michaels, where some very early windows, of Saxon or Norman date, having brick jambs and arches, exist above the present Norman arcade. St. Stephens, founded A. D. 980, where these bricks are used instead of stone quoins to form the angles of west end of nave, the walls of which are constructed of flint rubble.

There is also much early work at Colchester, which during the Roman occupation was an important fortified town. The church tower illustrated, of which the quoins, windows, arches, doorways, and dressings are formed with thin Roman bricks, presents a good example of the old material at hand being reused by the Saxon and Norman architects.

The examples mentioned above rather tend to show that the art of brickmaking was not practised by the Saxons and Normans, who found scattered throughout the country many remaining Roman brick buildings, from which they could, and probably did, draw their supplies. On the other hand, the art of brickmaking

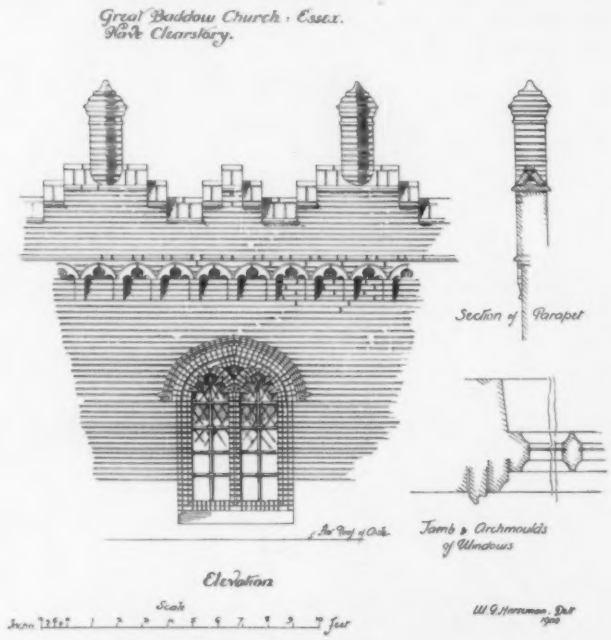
REDBOURNE CHURCH, HERTFORDSHIRE.

may have only been lost for some time after the departure of the Romans from Britain, as the process was simple and easily learned.

However this may be, we probably owe the introduction of brickmaking in more or less its present character to the Flemings, who came over from the low countries (Holland and Flanders) and settled in the eastern counties, that part of England where there was the greatest scarcity of building stone; in fact, the conditions here were very much akin to those the new colonists were used to in their own countries, where brick was certainly the principal, if not almost the only, building material.

The earliest examples of brickwork, of which the bricks have very much the form and dimensions of those used at the present day, are to be found in these eastern counties, and it is more than probable that these bricks were imported by ship from the Netherlands.

Flemish wool manufacturers are first recorded to have settled in Norfolk in the second half of the thirteenth



CLEARSTORY IN BRICKWORK, GREAT BADDOW CHURCH, ESSEX.

century, and in the course of another century had become very numerous throughout the eastern and southern counties, their influence on the brickwork in these places being distinctly perceptible.

The earliest known instance of brickwork in the modern manner is at Little Wenham Hall, in Suffolk, which was built A. D. 1260, which date coincides very nearly with that of the first Flemish settlement here.

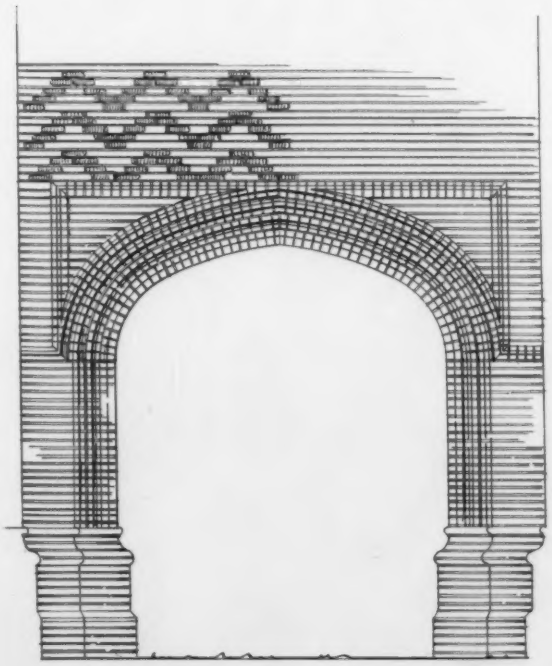
The building is a rectangle about 45 ft. long and 24 ft., wide, with a tower about 17 ft., 6 ins. square attached to the northeast angle. The ground story is vaulted in three bays. The hall, or living apartment, is on the first floor, and opening from this, on the east side, is the very interesting domestic chapel.

On the second floor is a long apartment, and over this is a flat, leaden roof. The exterior walls are finished with battlements, under which are loopholes, or oilets, widely splayed internally, through which arrows and

LAYER MARNEY TOWERS, ESSEX.

other missiles could be discharged. The bricks used in this building measure 9¼ by 4¾ by 2¼ ins., and are of a pale red color.

The Grammar School at Eweline, in Oxfordshire, is an excellent example of fifteenth-century brickwork,



ENTRANCE GATEWAY, LAYER MARNEY TOWERS, ESSEX.

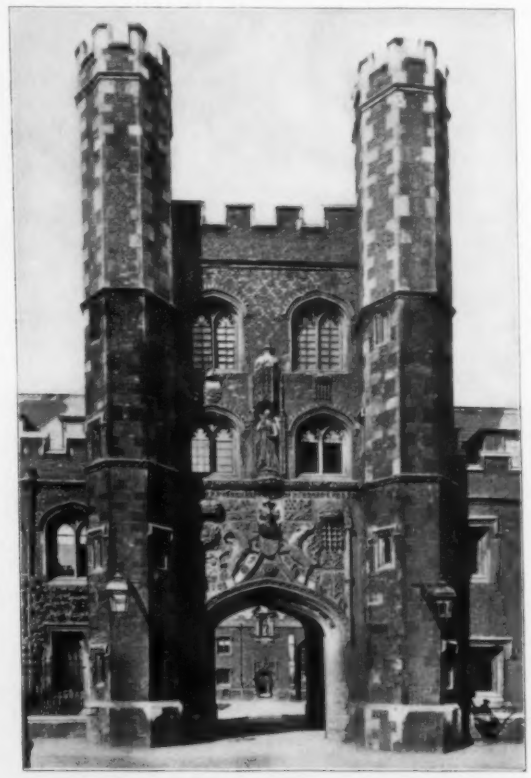
and the quadrangle of the adjoining hospital, or almshouse, which dates from about A. D. 1448, has its walls formed with oak uprights, and the spaces between these filled in with bricks laid in the herring-bone manner.

Eton College, a royal foundation of Henry VI., was begun about A. D. 1440, and to obtain a regular supply of bricks, a piece of ground was hired at Slough for an annual rent of twenty shillings, a brick kiln built upon it in 1442, and 66,000 bricks were brought to the College in May of the same year.

Many of the college buildings at Cambridge present excellent examples of early brickwork.

The earliest parts of Queen's College, founded by Queen Margaret of Anjou, A. D. 1448, are of but little later date than the foundation of Eton. The very fine gateway tower on the eastern side of the main quadrangle was commenced in 1448. It is built of red bricks, which are small and laid with very coarse mortar joints.

The western building upon the riverside is later, and the walling is of red brick with stone dressings. There is a small cloister walk under part of this building,



ENTRANCE GATEWAY, ST. JOHN'S COLLEGE, CAMBRIDGE.

built entirely of brick with four centered arches in three orders, with splayed bricks and plain piers.

The magnificent gateway towers of Trinity, St. John's, and Jesus colleges are entirely built of brick walling with stone dressings.

The first two are on a large scale, the tower in each case being flanked at the four angles by large staircase turrets rising well above the roof.

ROOS HALL, NEAR BEECLES, SUFFOLK.

In all these towers the bricks are rather irregular in form, and vary very much in color, and laid in the walls, with coarse wide joints, little trouble apparently was expended upon keeping the courses truly level, or the bricks exactly over those below, and the effect is now very fine and quite different to the snug and smooth look of most modern work, which is so dear to the bricklayer of to-day.

Caistor Castle in Norfolk, built by Sir John Falstaff some time prior to the year 1460, was a moated building of great size, originally covering six acres of grounds.

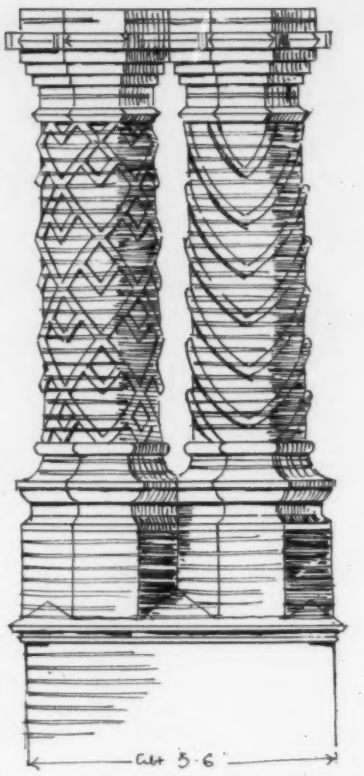
Oxburgh Hall, Norfolk, was erected at the end of the fifteenth century by Sir Edmund Bedingfield, who obtained a grant from Edward IV. in the year 1482 to build the manor house with towers, battlements, machicolations, etc. It is entirely built of brick, in square form, round a courtyard approached by a bridge spanning the moat, and through an arched gateway flanked by two octagonal turrets 80 ft. high, one of which contains a spiral stair of brick excellently worked. The floor of the great hall is paved with small fine bricks.

In the first year of Henry VII., A. D. 1485, a license was granted to Roger Fiennes to embattle and fortify his manor house of Hurstmonceaux in Sussex, and there is no doubt that the whole of the present building was erected at that date. It is of much interest as, though retaining all the general form of a castle with drawbridges and moat, it was rather intended for a residence, and though strong enough to stand the attack of marauders, would have been incapable of enduring a regular siege.

CHIMNEYS, PRESTON HALL, NEAR LAVENHAM, SUFFOLK.

The building consists of three courts, one large and two small ones. The main gateway here illustrated is in the center of the south front, and at each angle stands an octagonal tower 84 ft. high. The whole plan measures about 200 ft. north to south and 214 ft. east to west. The art of brickmaking was now carried to some perfection, as Dr. Lyttleton, writing some one hundred and fifty years ago, states that the fabric had stood three centuries' wear and tear, although in a very exposed position near the sea, without suffering the least injury in any part of its walls.

The church at Great Baddow, near Chelmsford in Essex, has a fine clearstory over the nave arcade entirely built of brickwork. Even the mullions, tracery, and cuspings of the windows are made in this material. The manner in which the window cusping is done is instructive.



CHIMNEY STACKS, PENSHURST PLACE, KENT.

The church at Feering, in the same county, has much good brickwork, notably, the porch, the buttresses, window tracery, mullions, trefoil arch, eaves course, and battlements are built with bricks.

The aisle parapets of St. Mary's Church, Redbourne,

ENTRANCE GATEWAY, CANTERBURY, KENT.

near St. Albans, have brick battlements, under which is a corbel table supporting cusped trefoil arches, also in brick.

Very late in the fifteenth or early in the sixteenth century, molded brick and terra-cotta began to be used

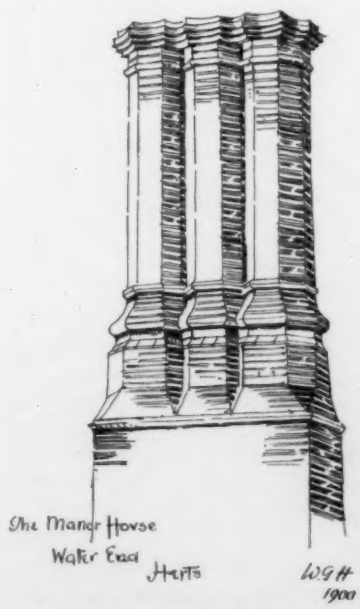
WATER END MANOR HOUSE, HERTFORDSHIRE.

in building, and with this variation came unmistakable signs of the Renaissance appearing here and there amid Gothic details and moldings, although the main features retained their mediæval character long after.

The introduction of terra-cotta was chiefly due to the influence of Italian workmen brought to England by Wolsey and Henry VIII., although it had been manufactured here in a very crude form before their arrival.

East Barsham Manor House and Great Snoring Rectory are very early examples of brick and terra-cotta work of this period; and the character of the work and the mastery over the material clearly show the influence, if not the execution, of Italian workmen.

The buildings date from quite the end of the fifteenth century, and are generally English in design; but the perpendicular tracery and moldings at East Barsham are combined with shields and plaques arranged as a frieze and cast from molds, and are distinctly Italian; while at Great Snoring the frieze is ornamented with terra-cotta heads, separated from each other by balusters enriched with the classic acanthus leaf.



CHIMNEY STACK, WATER END MANOR HOUSE, HERTFORDSHIRE.

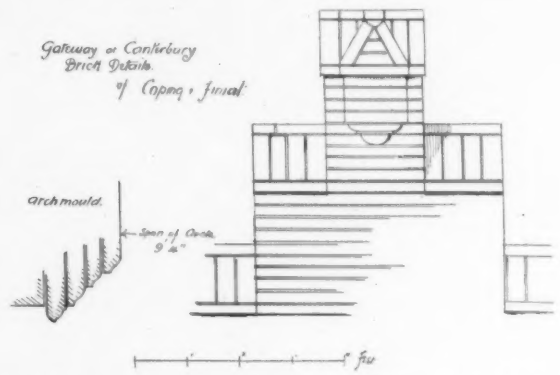
The sedilia in Wymondham Church, Norfolk, is an extremely rich piece of work, built early in the sixteenth century.

The earlier portions of Hampton Court Palace, commenced by Wolsey in A. D. 1515, though mainly built of brick with stone dressings, in the picturesque if debased style of the Tudor period, contains some interesting examples of early terra-cotta work, notably, the circular panels containing busts and Wolsey's coat-of-arms, all of which were probably executed by Magano.

Torrigiano, another Italian workman brought from Italy by Wolsey, executed a tomb with numerous large figures in terra-cotta, in the Rolls Chapel, Chancery Lane, London.

Great Cressingham Priory, built early in the sixteenth century, is a curious and interesting example of brick domestic work. The whole of the upper story and also the angle turrets on the south side being covered with richly molded brick panel work.

Other good examples of the use of brick and terra-cotta are to be found in the late Tudor domestic chapel attached to "The Vyne," a large house near Basingstoke



DETAILS, ENTRANCE GATEWAY, CANTERBURY, KENT.

in Hampshire; Sutton Place, near Guildford, in Surrey, where the terra-cotta details are extremely rich; and also Layer Marney in Essex.

The latter house is situated about twelve miles from Colchester, and is one of the best and at the same time almost the earliest example of brick and terra-cotta. Its erection was begun about A. D. 1506. The large gatehouse, giving access to the main courtyard, still remains in a fairly perfect condition. It is three stories high, the carriageway and two stories above the same, and at the four angles large turrets or towers, eight stories in height, flank these apartments, that is, two for each story of center block and two rising above the roof. The details of windows are well worked out in molded bricks with an enriched terra-cotta band at every alternate tier. The whole is crowned with an exceedingly rich cresting, or parapet, executed in terra-cotta.

The center windows of large apartments over the carriageway have elaborately molded and modeled mullions and heads in terra-cotta, of which material parapets and copings are constructed.

The bricks here employed measure about 10½ ins. in depth for every four courses, and the joints are about ⅝ in. thick; great effect is gained in the plainer portions of walling by the use of vitrified bricks arranged in diagonal lines.

Brickbuilding in Modern France. I.

BY JEAN SCHOPFER, PARIS.

BRICK has always been employed in French architecture. There are Romanesque brick edifices in France, and, in the south, Gothic ones. We know how successful brick was during the Renaissance, and numerous castles and palaces in which it was employed were illustrated in THE BRICKBUILDER last year. It might have been expected that the unfortunate revolution brought about in French architecture by the neo-classic would prove fatal to the use of brick. In fact, since the middle of the seventeenth century the development of so-called classical principles has had the effect of banishing from all architecture the colored element. Gray was deemed, then, the only really noble tone for buildings, and stone the only material worthy of being employed by architects. This opinion existed for some time.

It was only during the nineteenth century that people's eyes were opened anew to the charming possibilities of brick in architecture. Again it occupied a place of honor; the elegant structures of the Renaissance were studied, and it became evident that original might, by a good architect, be produced with brick. On the other hand, new materials affected the very life of architecture. Iron made a triumphant appearance, and brought with it absolutely new principles. With iron, in fact, there was no more necessity for heavy stone walls bearing weighty vaults. Iron sufficed unto itself; the trusses leaned upon steel piers; the wall became useless, at least, as a support, and was only necessary in order to isolate the interior from the exterior, as a space to be filled in. Henceforth, thin, light materials sufficed. None presented more advantages than brick, and brick was thereupon allied to iron. Both still have a glorious future.

Brick is not, however, necessarily employed with iron. It is, in itself, capable of every function; it has been employed in modern French palaces, castles, town halls, private houses, lyceums, schools, and barracks, for villas and for business houses. In fact, there are no services that have not been demanded of it.

I should like, in a series of articles, to pass in review the most interesting buildings which have been erected during the last twenty years in France, to criticize them, and draw from them a few, never-failing rules — alas, too often forgotten! — of the architectural employment of brick.

THE TROCADÉRO, PARIS.

There are a few axioms relating to this subject that can be briefly stated. In spite of their simplicity, they are not always applied.

In the first place, brick is not stone. This seems to be a foregone conclusion, but it is often forgotten. How many architects reproduce, in brick, forms proper to stone! This is contrary to all good sense, but happens frequently, as we shall see. Brick is a material of small dimensions. We must remember that in classical architecture the orders were not created for brick. It is true that they were imitated in brick during the Renaissance.

This is, perhaps, not a sufficient reason for our doing so.

Brick, made as it is in different colors, should, if we would develop the merits it possesses, inspire us to create a polychrome system of architecture, that is, a system where color not only plays a decorative part, but, moreover, accentuates the very structure of the building. This is not always the case. Do we possess a very reliable sense of color?

Finally, I beg the reader not to examine the monuments assembled here as he would models. There are, I believe, but few works in contemporaneous architecture which might serve as such. The fault does not lie with brick, and I should have as much trouble, perhaps more, in finding good models of stone architecture. I give here a glimpse of what has been done during the last twenty years. Some buildings are good, some mediocre, and some bad. The critic is not responsible. He can, and should say, this or that is good in such a monument, or this is bad. This conforms to reason and taste, and this does not.

Here, first, is the Trocadéro, which was built in 1878 and considered worthy to survive the Exposition for which it was erected. The two great wings added to the central building now shelter the Museum of Compared Sculpture. The central building encloses a vast concert hall, and we cannot accuse the architect of attempting to dissimulate its object. The exterior tells of the interior, and the two great arcaded galleries which encircle the concert hall form convenient outlets. The brick here is absolutely polychrome; the great matched brick arch stones alternate, in the arches, as do the layers of light and dark brick in the main building. Enameled bricks are introduced in the frieze in order to produce a decorative effect, completed by the roseworks of enameled terra-cotta in the tympanums. Finally, almost throughout the edifice, the architectural forms are exactly suited to brick. The arcades on the small and large towers are well becoming to brick buildings, and were inspired by the Romanesque style, which itself borrowed them from the Lombardian school, but whose first appearance really dates from the Byzantine monuments of Ravenna. The little edicules terminating them are of less happy effect.

THE CAPITOL, TOULOUSE.

Before examining the more modern applications of brick, we must point out one or two restorations as modern copies wherein brick plays an important part. We give here the facade of the Capitol of Toulouse, which in the majesty of its development might rank among the monuments of the seventeenth century. It was, however, built during our time, and I thought it of sufficient interest to be reproduced here, even if it is absolutely Louis XIV. in style. As we know, Toulouse has always excelled in the use of bricks. St. Sernin is

one of the most beautiful Romanesque brick monuments. Here we see the Ionic order, but I believe no architect can remain indifferent to the fine qualities of this building.

The Luxembourg Museum of Paris is modern, also, but built in the Renaissance style. The only color effect sought for here, as in many other well-known monuments, is the contrast between the white stone and the red brick. Brick can rightly aspire to newer combinations than this.

In the north, brick has always been successfully employed. Here is a big school at Armentières where brick this facade is of brilliant aspect. It is an example where brick, with very slight expense, can enliven a façade which economy obliges to be of great simplicity.

We have come to the most interesting work of this series, the lyceum of Lakanal, which M. de Baudot built twelve years ago. M. de Baudot is a man possessing a thorough knowledge of the history of his art; he teaches it at the Trocadéro Museum. But he has studied the history of architecture, not as many architects do, in order to find motives to copy or imitate, but, on the contrary, to discover the principles which were applied during the best periods, and to see if the same principles

THE LUXEMBOURG MUSEUM, PARIS.

only is used, and in an intelligent manner by Mr. Chipiez. I mean by this that decorative effects are drawn from its architectural employment, as, for instance, in the arches of the windows. On the other hand, decorative motives belong also to brick decoration. We find, in the form of the roof, the general shape dear to the northern regions, and of which Belgium gives us so many examples.

At Vieryon, in central France, another great school of the arts and crafts shows us a facade not entirely composed of brick, and where it is used only to play a decorative rôle in the filling in under the windows, in the voussoirs, and finally in chains across the facade. A white and a yellow stone complete the polychrome effect; would not be of use to us if we knew how to employ them according to our new materials and the different needs which are ours.

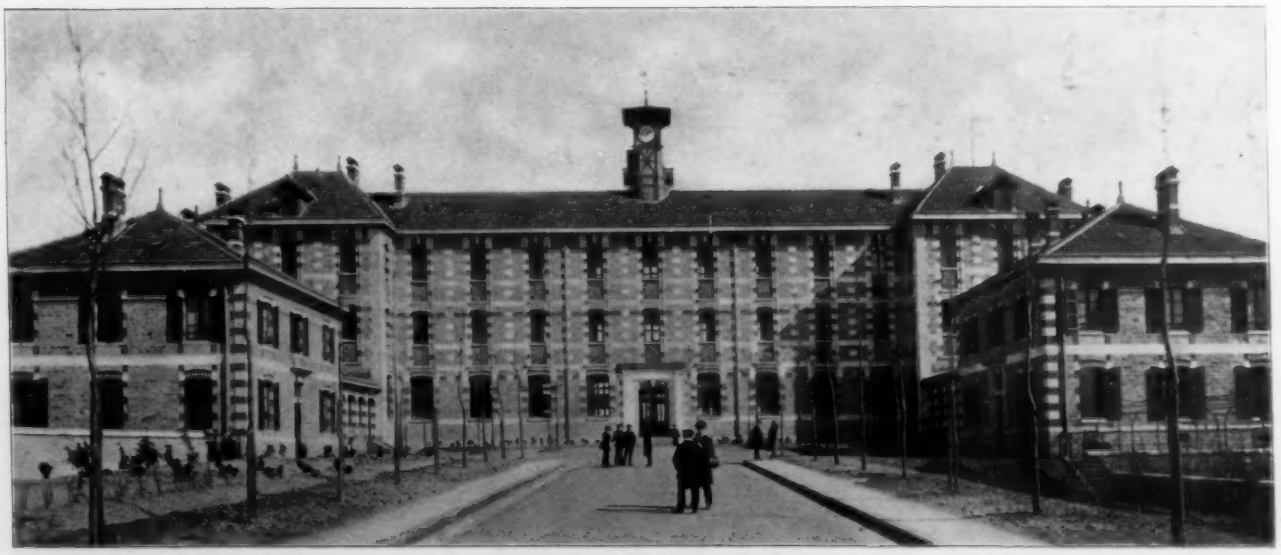
But M. de Baudot is a clever man. He has carefully refrained from trying to revive the Romanesque or Gothic, which are as ridiculous for our civilization as is the Greek style. He is truly modern. Consequently, we can always be sure that his works, whatever they may be, will be interesting. Here, then, is Lakanal, built of brick. And we see at once that the architect has treated it as such, that he has understood not only the structural forms of brick, but also its decorative possibilities.

Study these two photographs in their smallest details;

it is quite worth while. See how the walls are built, the piers between the windows, the window arches and their supports. Then see how happy is the decorative effect of the line of brick, and how the most complicated ornaments assume the shapes proper to brick.

Notice, also, the original cornice in high relief, the harmony of the whole, and the hardy manner in which the lines of construction are accentuated. This is not stone indifferently converted into brick. The building is one which all architects will find profit in studying, and which, if it is understood, will have an excellent influence on the rational development of good brick architecture.

PROFESSIONAL SCHOOL, ARMENTIÈRES.



PROFESSIONAL SCHOOL, VIERYON.

LYCEUM OF LAKANAL, PARIS.

LYCEUM OF LAKANAL, PARIS.

The Works of Rafael Guastavino.

PART I. AS ARCHITECT.

BY PETER B. WIGHT.

THE extensive works performed by Rafael Guastavino and those associated with him, in many localities throughout the United States, displaying such originality of conception and care in execution, seem to merit more than a passing mention among the many new constructive expedients for which the last few years have been memorable. Coming among us from Spain in 1881 a comparative stranger, he has, through extraordinary perseverance, not only merited the confidence which many of the leaders of architectural thought have placed in him, but made possible the development of architectural design in directions heretofore considered impracticable. While he has made possible many projects in design which were heretofore thought to be difficult and almost prohibitively expensive in execution, and carried

FIG. 1.

them out with a simplicity of construction by many considered daring if not impossible, it may be said that we have as yet but reached the beginning of the possibilities of original designs, for the execution of which we may intend to employ "Cohesive Construction." This is the name which Mr. Guastavino has applied to the system of which he is the father and main exemplar. After these nineteen years of untiring effort, the architects of America owe him a debt of gratitude for not only having been a faithful and conscientious contractor, but for having made possible a larger field for architectural design.

It is pleasant to know that all this has come to us from a trained architect, and that it is not the work of a self-seeking contractor only. It is also interesting to know that the subject of our story was brought up as a musician, and came from a family of musicians, and has given another demonstration that the transition is easy from a musician to an architect, as has been seen in the lives of the late Jacob Wray Mould and John Wellborn Root. He was born in Valencia, Spain, in 1842, but at seventeen forsook music for an architect's office, and

FIG. 2.

became a student of D. José Nadal, who was Royal Inspector of Public Works. On his death, which came from an accident in pursuit of his official duties, Mr. Guastavino went to Barcelona, took a University course, and afterwards entered the School of Architecture. He was connected with the office of the architects Granell & Robert until 1862.

His first important order as an architect was gained in competition in 1866, and I am able to present to the readers of THE BRICKBUILDER a photograph of it, for illustration, which will well bear examination (Fig. 1). This and some of the succeeding illustrations will serve to show that Barcelona is a modern and progressive city. It shows also that her architects were not without refinement and moderation in their designs, and that even in old Spain a young professional of twenty-four years had opportunities which were rarely exemplified at that time

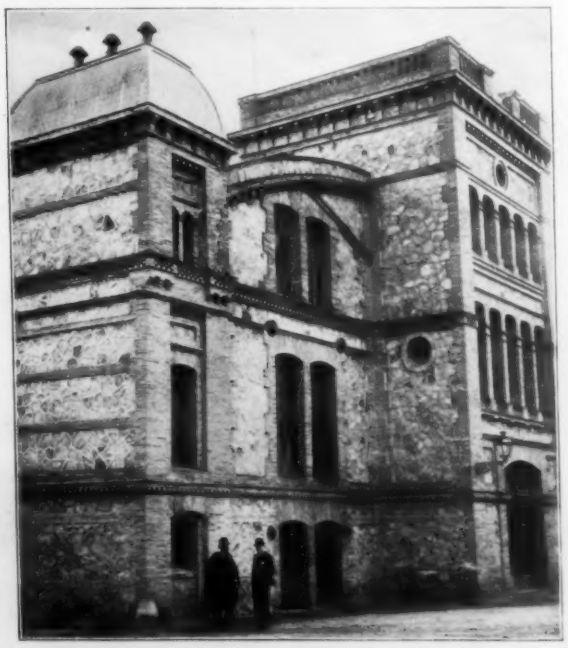


FIG. 3.

FIG. 4.

even in our own country. Mr. Guastavino was an enthusiast in cohesive construction from the very beginning of his career, first pinning his faith to cement and concrete. But in so doing he encountered difficulties; for then no reliable cement was made in Spain, and the ultimate improvement in its manufacture was due to his exertion. The cement that he first used was made at Gerona. It was a semi-quick-setting cement. But when he erected his own house at Barcelona in 1872, of which he was both architect and builder, of which a photograph is here shown (Fig. 2), he used an English Portland cement. After that he used a cement made by Dr. R. Montestru at Tardienta (Aragon), a few miles from his own country

FIG. 6.

seat at St. Gines. During his dealings with Dr. Montestru he gave the doctor Vicat's book on cement manufacture, with the help of which he succeeded in making a free silicate, or Portland cement of fair quality.

Having embraced the profession of a builder as well as architect, as was then customary in Spain, he was largely engaged for many years in the erection of mills and factories, in which the necessity of fire-proof construction was evident, and while erecting these he had every opportunity to experiment with concrete and tile for floor and roof constructions. He was guided by the study of the architecture of the Byzantines and Persians, whose influence had been felt in Spain from the third to the fourteenth century. These conditions can best be described in his own words. Buried in the uncut publications of the American Institute of Architects, without table of contents or even headlines, can be found a paper read by Mr. Guastavino before the International Congress of Architects at Chicago, in 1893, from which I may

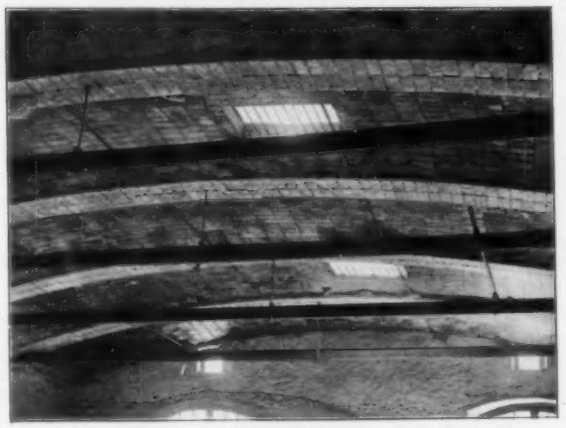


FIG. 5.

make frequent quotations. On this condition of the development of the primitive cohesive system of building in Spain, he said: "The imperial edict of Constantine, declaring Christianity to be the State religion, transferring at the same time the capital of the Roman Empire to Byzantium, drove the eastern European and western Asiatic Jewish race and other sects, for the first time after Christ, into emigration, giving occasion, perhaps, for the later invasions of the Arabs and Mussulmans. Spain was the principal attraction for emigrants, not only on account of climate, richness, and the already relatively large commercial relations with the Greek Empire, but also on account of the freedom and religious tolerance, as is always the case in new countries. Byzantine churches and cathedrals were built in Spain at the same time that synagogues were tolerated. These edifices were of remarkable constructive character. . . . The character of the most ancient Byzantine and Romanesque types in Spain was of monolithic construction, made of conglomerated material. The walls and floors (like other specimens relatively modern) were, some of them, of stone and concrete, others concrete alone. For the second, it seems that molds or heavy centering were used, giving to the material an appearance outside like a cast mass, as can be seen by specimens of walls with large portions of floors and vaulted ceilings, which are yet in existence,

FIG. 7.

showing perfectly their construction. Some domes were built with stone and packed with the same casting-packing material referred to, probably without centers, because there is small ashlar; and it is yet customary there to build domes of that kind, using only a stick-pole as a radius, and closing each time the ring of stone, so that no centering is used in such case. The construction was the same in the period of the Arabs and the Moors. It was like that of the rest of Spain, Byzantine in style."

It was the study of these that led him at first to revive the ancient concrete constructions. In 1868–69 he built the great factory of Batllo Brothers, covering four blocks, which was gained in competition. The buildings contained 64,000 spindles, 1200 looms, a bleachery, warehouse, etc. These buildings were, some of them, five stories high and all of cohesive construction, that is to say, some of the floors were of concrete, and others, and the roofs, were arched with tile, while the circular stairways were built monolithic with tile. The general style of the exterior was similar to Fig. 3., which, however, is from a photograph of a factory built later for Muntadas, Aparicio & Co., in 1875. The erection of the Batllo building, the first in which cohesive tile construction was used, attracted a great deal of attention from architects and the instructors of the School of Architecture, who visited it with the students while it was in progress. It was during the erection of the Muntadas factory that the government engineers made an inspection of the floor and roof construction, a combination of tile arches and iron tension members for which a patent was granted to Mr. Guastavino. The illustration (Fig. 3) shows the ingenious way in which he combined rubble masonry and brick in the exterior walls. Other mills and factories, built or designed by him after this time, in which the cohesive construction was used, comprised the woolen mills of D. Carreras (of which an illustration is given in Fig. 4), erected in 1876, of Vidal & Sons, Rosic, and the porcelain works of Florens & Co. In the latter he first used tie-rods of iron concealed in the arch, on account of the great heat of the kilns, which has led to the use of this system so extensively in our own country.

Fig. 5 is an illustration of the interior of the roof of a warehouse built for Mr. Grau at Barcelona, in 1877. This was the first building in which the cohesive construction was used of dome form with tie beams. The span of the roof is 28 ft. Fig. 6 is an interior view of a circular concert theater erected at Villasar. The roof over the boxes is supported by segment arches, from wall to columns, between which are the ceiling arches, and the dome roof is 46 ft. in diameter, with lantern in the center,—all of cohesive tile construction.

Two more examples only of street architecture will be given. Fig. 7 is another example of a corner house designed and built by Mr. Guastavino, in Barcelona, in 1868–69, as the result of a competition. A large part of the exterior details are executed in cement, including the frieze, with bas-relief figures on the "pan-coupé" and the main cornice. This house has a spiral stairway entirely built of concrete, with marble treads.

Fig. 8 is the city warehouse, office, and residence of D. M. Cossademunt, the glass manufacturer, for whom also he designed a factory. The roof of the latter was a trussed tile arch of about 40 ft. span. The location of Mr. Guastavino, in the important manufacturing city of Barcelona, was of great advantage to the development of his ideas. His clients were manufacturers to whom fire-proof methods of building were before unknown. They were prosperous, and hence there was also opportunity for the refined taste of an architect in designing their residences. The illustrations here reproduced give evidence of the existence of a modern and progressive city in Spain, which will surprise many readers. The building shown in Fig. 8 will be seen to be a very excellent and rational one, built of two shades of brick with stone,

FIG. 8.

while adjoining it on the right is a six-story building, which was in progress when the photograph was taken.

The cohesive construction, making it possible to make these buildings fire-proof, supplied a want that was then beginning to be felt at Barcelona, and Mr. Guastavino might have continued to fill it but for an accident which brought him to this country, where he found a still larger field of operation, as will be seen in the article to follow.

Fire-proofing.

AN ATTEMPT TO DEVISE A SYSTEM OF ABSOLUTE FIRE-PROOFING FOR INTERIOR STEEL CONSTRUCTION.

FORMERLY, the words "fire-proof building" denoted one in which certain incombustible materials were used. Then the words "modern fire-proof building" came to be used to indicate one in which improved methods had been used, and in which some attention had been given to protecting steel construction. Sometimes we hear the words "absolutely fire-proof," which some claim has no meaning in fact. The "absolutely fire-proof" buildings referred to are generally those which will resist total destruction if their combustible contents take fire, but are liable to be damaged to the extent of their inside furnishings, whether of wood, marble, iron, or any other destructible material. It is only in proportion as these materials are omitted in the interior finish and the fire-proofing materials become indestructible that the building approaches the condition in which it may be called "absolutely fire-proof." Wall plastering as an interior finish is not referred to, because it is used almost everywhere as a coating upon fire-clay tiles. In all experiences thus far of fire-resisting construction, when subjected to an accidental and actual conflagration, the plastering, of whatever kind, has proved to be of little assistance to the hollow tile. It generally falls off in the early stages of a fire. And while some owners of proprietary compositions claim that they are fire-resisting, none of them as yet has had an actual experience in a fire to point to. The only kind of wall plastering that has heretofore resisted fire to any extent is the simplest of all — lime and sand — used both for first coat and finishing coat without gauging, and very seldom used now except in the city of Cincinnati. It may be assumed that unless this is used on fire-clay fire-proofing, the fire-clay must be the sole dependence for protection.

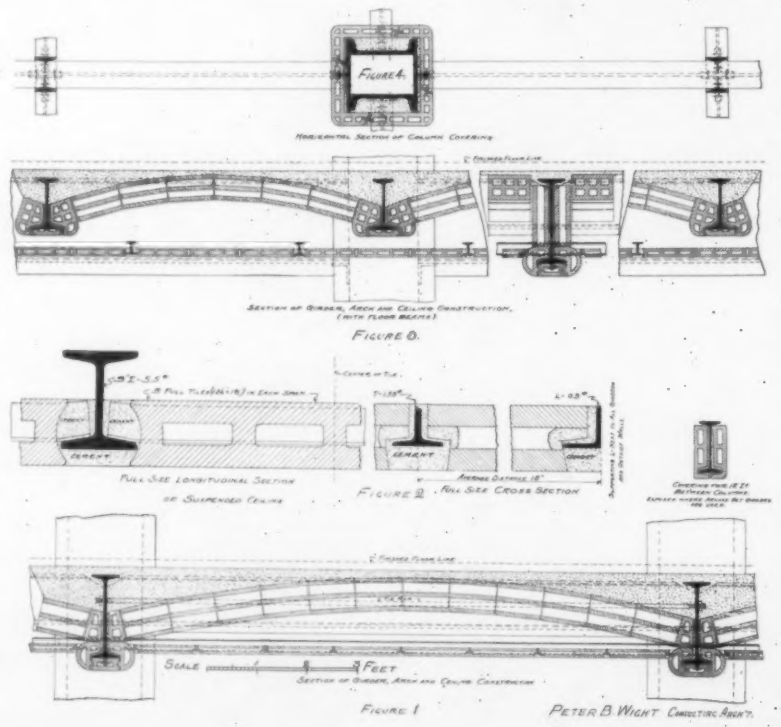


FIGURE A.
HORIZONTAL SECTION OF COLUMN COVERING
SECTION OF GIRDER, ARCH AND CEILING CONSTRUCTION.
(WITH FLOOR BEAMS)
FIGURE D.
FULL SIZE LONGITUDINAL SECTION
OF SUSPENDED CEILING
FIGURE B. FULL SIZE CROSS SECTION
SCALE 3 FEET
SECTION OF GIRDER, ARCH AND CEILING CONSTRUCTION
FIGURE I
PETER B. WIGHT CONSULTING ARCH'T.

A building, all the interior surfaces of which are of fire-clay covered with plain lime mortar, in which as little as possible of anything else is used, and the floors of which are finished with Portland cement (the use of which in sidewalks has lately been brought to such a high degree of perfection), may now be considered the nearest approach to an "absolutely fire-proof" building. The United States Clay Manufacturing Company, of Pittsburgh, New York, Boston, and Chicago, with the assistance of their expert in fire-proof construction, Peter B. Wight, of Chicago, has recently prepared a series of drawings and specifications of interior construction, showing their latest improvements on systems which are no longer experimental and now most successfully used, and their adaptation in detail to buildings in which the highest order of fire protection is required.

First, with reference to material. They have decided to recommend, in such cases, neither dense hard tile which is brittle, nor porous terra-cotta which is soft, but semi-porous terra-cotta, which partakes of some of the qualities of both, and in some respects (one of which is resistance to the smashing test) is superior to either of them. Semi-porous terra-cotta has, in actual and severe fires, already demonstrated that it has this quality. It is made with the largest possible amount of fire-clay, some shale, and about one half of the proportional amount of sawdust usually employed in the manufacture of porous terra-cotta. The thickness of the walls and webs of the hollow semi-porous tiles is about 50 per cent. greater than that of hard tiles, which makes it about 25 per cent. less than the thickness of porous terra-cotta hollow tiles, for most porous terra-cotta is twice the thickness of hard tile. The weights of the tiles are about the same in all three kinds when measured by superficial feet.

The drawings herewith published, which were made by Mr. Wight, do not show any essential novelties of construction. In one respect they are made according to the theory advanced by him (first in the columns of THE BRICKBUILDER), that the under side of a hollow tile floor, to be absolutely fire-proof, must be a double construction: a heavy construction above for the floor, and a light construction beneath for the ceiling. The light construction of the ceiling is an additional protection to the under side of the floor. It takes the first brunt of the fire, and, therefore, must be made of the best fire-resisting materials, used so as to thoroughly protect the steel members necessarily used with it. Not forming any part of the floor construction, it is easily and economically repaired if damaged by fire, saving much of the extensive repairs, practically amounting to reconstruction if a few tiles forming the floor arches are cracked. But it is not to be supposed that the space between the two can

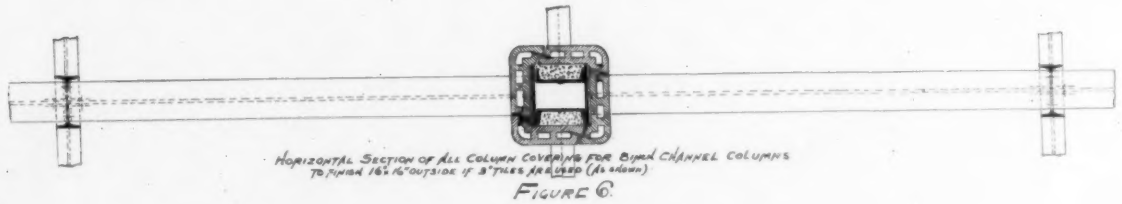
be used for ventilation or for any purpose that would prevent its being hermetically sealed against the admission of fire draughts.

For further description, reference will be made to the illustrations which show in detail the steel work, fireproof material, and concrete ballast. Fig. 1 is a section of a floor, constructed with 20-in. steel girders placed 12 ft. from centers, with bearings on columns at 13 ft., 4 ins. from centers, to carry a movable load of 150 lbs. per superficial foot. The columns are tied together transversely with 12-in. I-beams, which are covered independently. The 20-in. girders are also tied at their centers of span with tie-rods set high enough to be built into the segment arches. The sections of the girder and skew-back tiles are self-explanatory. All walls of tiles are 1 in. thick, and all exposed parts of girders are covered with at least 3 ins. of tile, with a hollow air-space. The soffit tiles are secured with tapped screws shown in Fig. 1, of the same steel construction of columns, girders, and ceiling, but varied by the insertion of 12-in. I-beams between the girders, and segment arches between the 12-in. beams — a less economical construction by reason of using the 12-in. I-beams. These are 6 ft., 8 ins. from centers. The soffit tiles give a protection of 1 in. of tile and ½-in. air-space to the beams. The hollow skew-backs are longitudinal with the beams, and the end pressure arch tiles are 6 by 10 ins. with six holes in each. The plan of the column is here shown in Fig. 4. It is covered with four L-shaped tiles 3 ins. thick, with walls 1 in. thick, and a 1-in. air-space in each. In addition the space between the column and the tiles is filled with concrete. The edges of the tiles are o.g. shaped, and they are cramped with steel cramps. In every other course the tiles are reversed, thus breaking joints.

Fig. 5 shows the section, and Fig. 6 the plan of construction for a light attic or ceiling floor to carry 50 lbs.

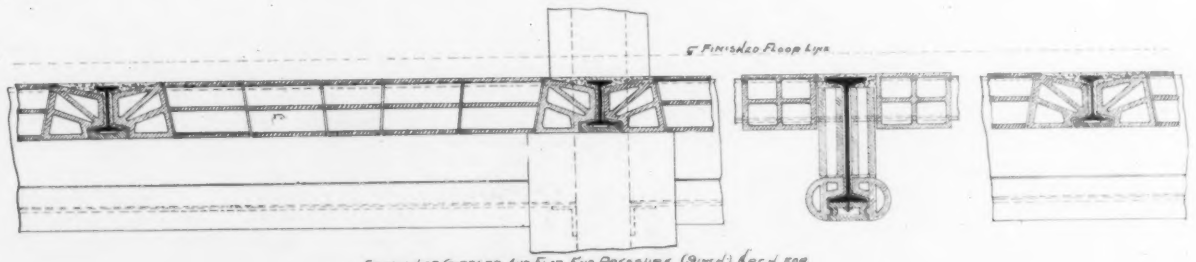
SECTION OF GIRDERS AND ARCH FOR ROOF

FIGURE 7.



HORIZONTAL SECTION OF ALL COLUMN COVERING FOR BYRD CHANNEL COLUMNS TO FINISH 16" IS OUTSIDE IF 3" TILES ARE USED (As shown)

FIGURE 6.



SECTION OF GIRDERS AND FLAT END PRESSURE (9 INCH) ARCH FOR ATTIC FLOOR CONSTRUCTION WITH I BEAMS

FIGURE 5.

to the girders. The segment arches are end pressure, built with 8 by 12 in. tiles having six holes in each. For the flat ceiling, shown in Fig. 2, 3-in. 5.5-lb. I-beams are built between the girders at 3-ft. centers; and between the 3-in. I-beams are set loosely 1.33-lb. T's at 18½-in. centers and 0.9-lb. angles at the ends against the girder covering. Each T or angle carries three hollow ceiling tiles, which are 12¼ by 18 ins. with rebated ends, where they rest on the T's and angles. The tiles have coves at both sides to hold the mortar joints. The small T's and angles are set by the tile layers. The small T's and angles are thus covered by the tiles and mortar joints, as well as the 3-in. I's.

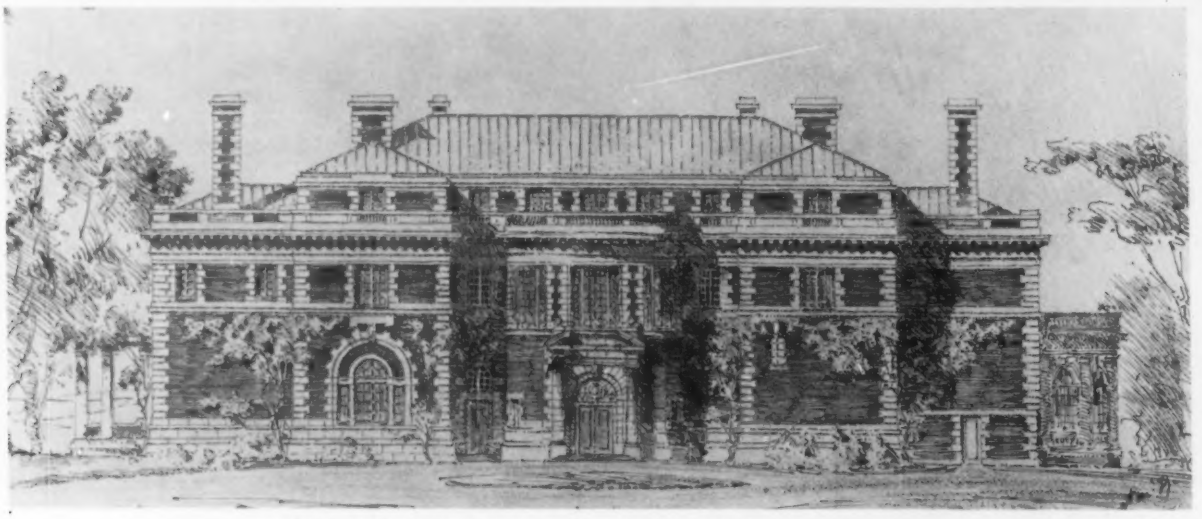
Fig. 3 is a sectional drawing at right angles to that per superficial foot. The girders are light 20 in., and the floor beams 7 ins., and all spaced as in Fig. 3. Here the girders are covered in the same manner as in Fig. 3, the soffit tiles and skew-backs of the flat arches are of semi-porous terra-cotta, and the 9 by 12 in. arch tiles are of hard terra-cotta. The column shown in Fig. 6 is similar to that in Fig. 4, but smaller.

Fig. 7 is a section of roof construction with 20-in. light girders, 12 ft. from centers, and light segment end pressure arch. The same care in here protecting the girders is taken. The segment arch is of 6 by 10 in. semi-porous tiles with six holes, and the haunches filled with concrete only to the tops of the girders. The tie-rods are buried in the arches.

Selected Miscellany.

NOTES FROM NEW YORK.

The progress made in New York in any single year is really wonderful, speaking from the architect's standpoint. The last ten years have seen a revolution. The



HOUSE AT HYDE PARK, N. Y. YORK & SAWYER, ARCHITECTS.

building of the Columbia University Library, of the Cathedral of St. John, the great arches of which are conspicuous on Morningside Heights, the new buildings beyond the river, of the University of New York, the improvement of Riverside Drive, giving one of the noblest views in the world, the completion of the enlarged Museum of Natural History, the great Public Library that is to be erected on 42d Street, the new building of the Brooklyn Institute near Prospect Park, the new bridge across the East River, the subway in course of construction, and most of all the intellectual and æsthetic progress that all these imply, — denote that the metropolis is taking its place among the greatest cities of the world as a desirable place of residence as well as a profitable place to work.

HOUSE AT NEWTON, MASS.
Roofed with "Ludowici" roofing tile.
Willard T. Sears, Architect.

And still there are rumors of more big hotels. Mr. Gates of the great Steel Trust and his friends intend to erect a hotel which will rival anything of the kind in New York in magnificence, if not in size. It will cost $2,000,000, and will be erected on the southeast corner of Fifth Avenue and 52d Street, which property is valued at $1,000,000. Several architects have prepared competitive plans, but at this writing no decision has been reached.

The number of plans filed recently, and the amount of expenditure represented, is simply marvelous. Good times have certainly come to the architects of this city, and we are praying for "many happy returns of the day." By the way, it may interest readers of THE BRICKBUILDER to know that there is a great scarcity of good unemployed draughtsmen in the city, and if there are any embryo Rugelos, or Wrens, or Garniers hidden away in obscure places, they might do well to take a "run down to the city." There are several architects who have spent lots of valuable time trying to find good men. Of course, most of us politely bow out the average "journeyman draughtsman." Some sort of an employment agency would fill a long-felt want, and would be a legitimate business for a good man.

Another hotel to be built by a wealthy syndicate will be erected on Park Avenue, between 41st and 42d Streets, being very convenient to the Grand Central Depot. The building will be commenced very soon, but great secrecy

HOUSE AT CINCINNATI, OHIO.
Roofed with "American S." roofing tile.
S. S. Godley, Architect.

has been preserved as to the identity of the architect and as to particulars in regard to the building.

The carrying into effect of the plan for the Interstate Palisades Park now depends upon the action of the New York Legislature. The Legislature of New Jersey has approved the Park act, which authorizes the joint commissioners of New York and New Jersey to "select and locate such lands, lying between the top or steep edge of the Palisades and the high water line of the Hudson River, as may, in their opinion, be proper and necessary for the purpose of establishing a State Park, and thereby preserving the scenic beauty of the Palisades." There will probably be no opposition to this act, and a result will be reached which has been striven for for many years, and for which result we will be eternally thankful.

FRIENDSHIP SCHOOL, PITTSBURGH, PA.
Terra-cotta made by the Northwestern Terra-Cotta Company.
C. M. Bartberger, Architect.

NOTES FROM CHICAGO.

As a result of the prolonged period of building inactivity, through which Chicago has passed since 1893, the present revival finds her short of architectural draughtsmen. As a result, the demand so exceeds the supply that a good T square and pencil pusher is at a premium, although there is really no "boom" in building nor is there likely to be one.

The first annual traveling scholarship of the Chicago Architectural Club has been awarded to N. Max Dunning. The interest in the five competitions, involving the various stages in the design of a "United States Embassy in a European Capital," has been very keen, and the competitors, varying in number from fourteen in the second to four in the final competition, have done themselves and the club great credit by their industry, and by the ability they have shown in attacking a very difficult problem.

The Architectural Club has appointed as delegates to the approaching second annual convention of the Architectural League of America, at Philadelphia, Joseph C. Llewellyn, president of the League, and Robert C. Spencer, Jr., of the executive committee.

HOUSE AT BEVERLY FARMS, MASS.
Roofed with Celadon roofing tile.
William G. Rantoul, Architect.

Herman Van Holst is preparing to make an extended European tour, and has resigned his position with Shepley, Rutan & Coolidge.

The fourteenth annual exhibition of the Architectural Club, which opened on the twenty-eighth of March, is now in progress, and while the number of exhibits is less than in recent years, the standard of quality is high and presents unusual interest and variety. There are comparatively few *projets* from the schools which usually take up much space and do not greatly interest the average visitor. Chicago has a room of selected drawings, the well-known contributors being Mr. Sullivan, with photographs of the

PANEL, PAUL E. DUBOY, ARCHITECT.
New York Architectural Terra-Cotta Company, makers.

Guaranty and Condict Buildings, his cottage at Ocean Springs, Miss., and a very fiercely polychromatic Russian Church in blue, purple, scarlet, and gold; Birch Long's imaginary garden, embassy gates, and Jackson Park sketches show a charming originality and artistic feeling; Hugh Garden's little theater and country house are particularly nice, both in design and drawing; Richard Schmidt's hospital, drawn by Mr. Garden, is a very dignified and restrained piece of design, somewhat suggestive of "the new movement"; and Mr. Spencer and Pond & Pond have some characteristic country houses.

The feature of the exhibition is undoubtedly the collection of drawings from San Francisco, chiefly contributed by Willis K. Polk. There are also a number of interesting things from Bliss & Faville and Coxhead & Coxhead. The star drawing is Mr. Polk's line rendering, a very large bird's-eye of the proposed peristyle at

CAPITAL, BY THE NEW JERSEY TERRA-COTTA COMPANY.

the foot of Market Street, San Francisco, from behind the tower. The city and hills beyond are managed with unusual artistic skill and a remarkably clever technique. Altogether the club is very grateful to Mr. Polk.

To conclude a hasty survey, there is a case of the always beautiful Grueby ware and a case of equally interesting pottery from Mr. Gates, of the American Terra-cotta and Ceramic Company, who is producing some new and beautiful effects in soft, dull glazes in greens, yellows, reds, and metallic lusters.

NOTES FROM ST. LOUIS.

The site for the World's Fair has become the absorbing topic in building and realty circles. Now that all uncertainty regarding the fair is removed, the impression prevails that the coming years will witness unprecedented activity in building; in fact, many important projects are assuming definite shape, and architects are busily engaged on prospective work.

The scheme to condemn the property in the block immediately north of Union Station, and make a park of it, has been revived and is receiving such universal support that it is thought the municipal assembly will act favorably upon it. One or two large hotels and a number of other substantial improvements are now being considered for adjacent blocks should this be done.

Architect Isaac Taylor has prepared plans for a building for the Delmar Jockey Club, to be located on Taylor

SPANDRELS, C. B. J. SNYDER, ARCHITECT.
Standard Terra-Cotta Works, makers.

Avenue, and has drawings on the boards for a large commercial building on the site of the old Belvedere Hotel Building on Washington Avenue, Thirteenth, and St. Charles Streets.

Mr. William B. Ittner, commissioner of school buildings, is to be congratulated upon the design of the Horace Mann School, on the corner of Oak Hill and Juniatta Streets, it being the most interesting of the number of successful schools he has built.

The munificent gift to the public library of $1,000,000, by Mr. Andrew Carnegie, will doubtless enable the erection of the long-desired building, and also several branch libraries, it being one of the conditions that one half the sum should be used for that purpose. The board several years ago purchased the block between Olive, Locust, Seventeenth, and Eighteenth Streets, but this is not generally considered the most desirable place, it being the almost universal opinion that the Exposition Building,

CARTOUCHE PANEL, CLINTON & RUSSELL, ARCHITECTS.
Perth Amboy Terra-Cotta Company, makers.

having outlived its usefulness, especially in view of the more important event in prospect, should be removed and the library built there. The ground belongs to the city, having originally been a park, and must eventually become a park again, and it would be an ideal location.

The St. Louis Architectural Club is considering the feasibility of establishing a traveling scholarship, and hopes to be able to send one of its members abroad this summer. At a recent meeting, William B. Ittner gave an illustrated lecture entitled the "History of World's Fairs," and at a meeting held March 23, he read a paper on "Japanese Gardens."

Mr. John B. Hughes has presented the club with the library of the late Architect Furber.

NOTES FROM PITTSBURGH.

It is difficult to realize that, with the first of April, the greatest business concern of Pittsburgh, one so intimately associated with the building business, the Carnegie Steel Company, has ceased to have a separate corporate existence, and is now but one of the many divisions of the United States Steel Corporation. Many of us who have been accustomed to "call up" the Carnegie Company to find out this and that about our framing plans will still be asking for the Carnegie Company, I fear. What effect this new concern will have on Pittsburgh industries is the subject of some discussion here.

PILASTER PANEL.
Conkling-Armstrong Terra-Cotta Company, makers.
Willis G. Hale, Architect.

With the announcement of Mr. Carnegie's retirement has come a letter to Pittsburgh outlining some of the many things he is to do here, not only for the Carnegie Institute and the new technical institute, but for the libraries in surrounding towns, and for his old employees. He has already given $4,000,000, the income of which is to be used to pension old employees, aid those who may be injured, and help the families of any of the workmen who may be killed. This is, we believe, the first attempt of this kind where the men themselves do not contribute.

This year the examinations for the John Stewardson Memorial Scholarship were held here simultaneously with those in Philadelphia. The announcement was not made sufficiently long before to enable many of our draughtsmen to enter, and we hope they will be given here again next year.

ENTRANCE, BROAD STREET NATIONAL BANK, TRENTON, N. J.
Whole first story of mottled gray terra-cotta. Excelsior Terra-Cotta Company, makers.
William A. Poland, Architect.

IN GENERAL.

The committee on Vacation Traveler of the Boston Architectural Club announce the election of Gordon Allen as the recipient of this year's fund.

There was an exhibition of Beaux Arts drawings by Herbert D. Hale, J. Harleston Parker, and Guy Lowell in the rooms of the Boston Architectural Club and the Boston Society of Architects, from Saturday, April 6, to Saturday, April 13, inclusive.

Woodman, Newman & Harris, Philadelphia, have won the competition for the new Rittenhouse Club Building, this being the third local competition of prominence they have gained. The others were the new City Troop Armory, and the Corn Exchange Building at 3d and Chestnut Streets.

The Penn Buff Brick and Tile Company of Newark, N. J., manufacturers of the "Blue Ridge" enameled brick, has changed its corporate name to that of Blue Ridge Enameled Brick Company. In all other respects the company remains unchanged.

On April 1, the general offices of the Tiffany Enameled Brick Company were removed from the Marquette Building, Chicago, to the company's works at Momence, Ill., about fifty miles out of Chicago. The Thomas Molding Company, Chamber of Commerce, will act as

CAPITAL, KEES & COLBURN, ARCHITECTS.
American Terra-Cotta and Ceramic Company, makers.

general sales agents for the Tiffany Company at Chicago, although the company's business will be under the direction of the president of the Tiffany Company, Mr. J. Van Inwagen, while J. Van Inwagen, Jr., takes full charge at the works. This change is necessitated by a largely increased business.

In the fall of 1872, the Union Akron Cement Company, through its Chicago house, furnished twenty-one hundred barrels of the Akron (Star brand) cement to the United States Government, for putting in the lower part of the concrete foundation for the Chicago Post-office. Nearly twenty-five years afterwards, during the spring of 1897, the Chicago Post-office was taken down, to make room for a new and larger building.

In the May, 1897, issue of the *Cement and Engineering News*, page 74, the following in reference to the concrete foundation is found: "In the wrecking of the Chicago Post-office, the contractor encounters a mass of 14,000 cu. yds. of concrete, underlying all foundations, walls, and vaults, while a continuous mass or slab of concrete covers the entire area of the building from 3 ft., 6 ins. to 4 ft., 6 ins. thick. The space between the under side of the basement floor and the top of the concrete slab is filled in with Louisville cement; this yields easily to only slight efforts. The concrete slab, composed of a higher grade of cement, is tough and refractory, and is giving the contractors much trouble, and is the cause of the delay in clearing the site, and involves a penalty of one hundred dollars per day to the contractors, running since April 1. The work of removal of this large body of concrete is being vigorously prosecuted by the aid of numerous steam drills and dynamite. Even this proves a slow and tedious process, and is an object lesson as to the respective qualities of a good and a sometimes indifferent cement." The concrete slab mentioned, that was so tough and refractory, was made with the Akron (Star brand) cement, manufactured by the Union Akron Cement Company, Buffalo, N. Y.

CARTOUCHE OVER ENTRANCE.
Atlantic Terra-Cotta Company, makers.
A. H. Bowditch, Architect.

Height 15 ft.
GROUP ON ROOF OF NEW ORPHEUM THEATER, BROOKLYN.
Made in white terra-cotta, by B. Kreischer & Sons, New York.
Frank Freeman, Architect.

PANEL, GEORGE H. MILLER, ARCHITECT.
St. Louis Terra-Cotta Company, makers.

M.101

HOUSE, 6 EAST 79TH STREET, NEW YORK CITY.

BARNEY & CHAPMAN, ARCHITECTS.

ПОЛЯ

ENTRANCE GATES, HOUSE AT BUFFALO, N. Y.

GREEN & WICKS, ARCHITECTS.

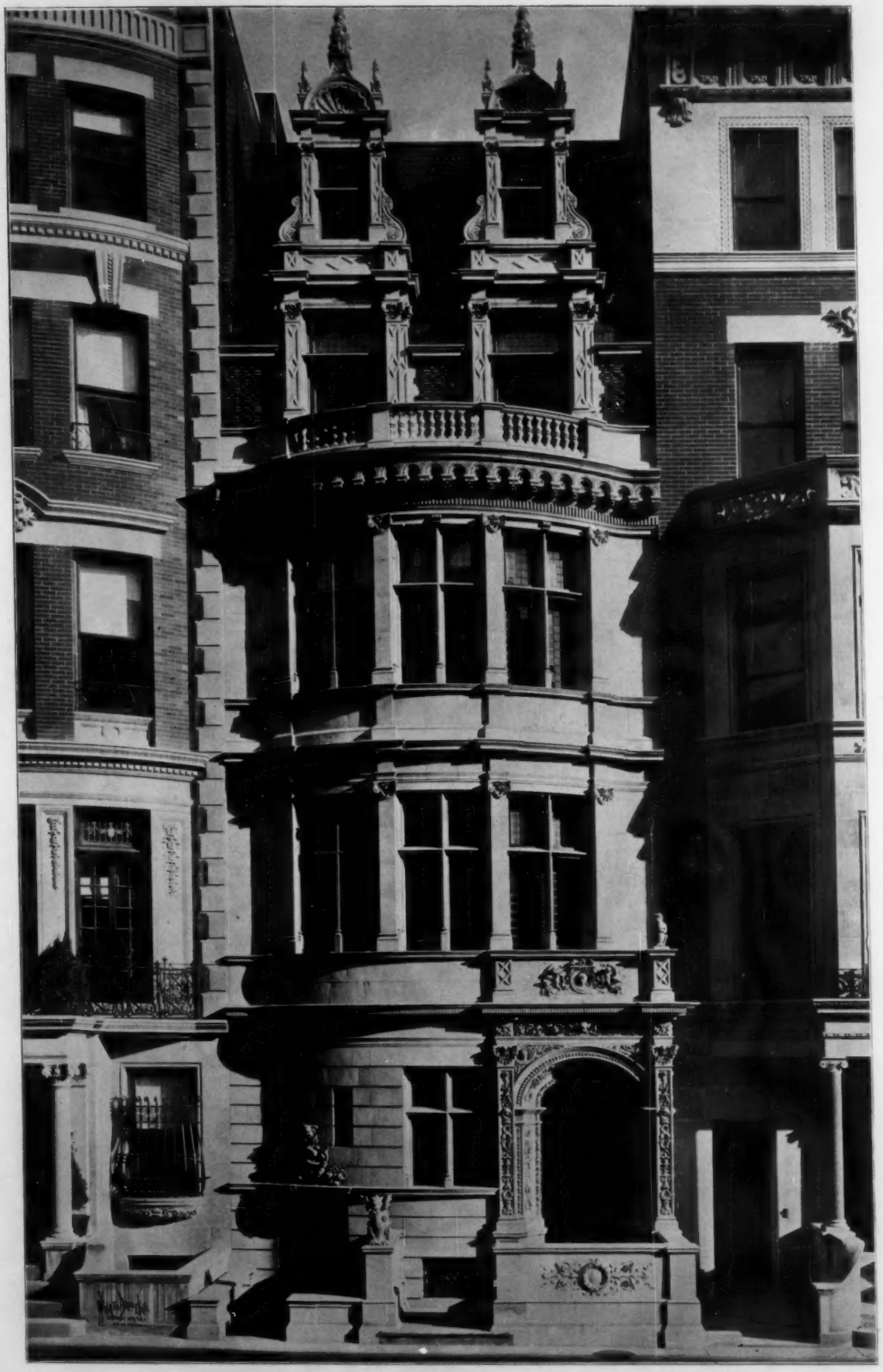
HOUSES AT BUFFALO, N. Y.
GREEN & WICKS, ARCHITECTS.

PRATT FREE LIBRARY, WOODBERRY, MD.

JOSEPH EVANS SPERRY, ARCHITECT.

TELEPHONE BUILDING, ROCHESTER N. Y.

J. FOSTER WARNER, ARCHITECT.

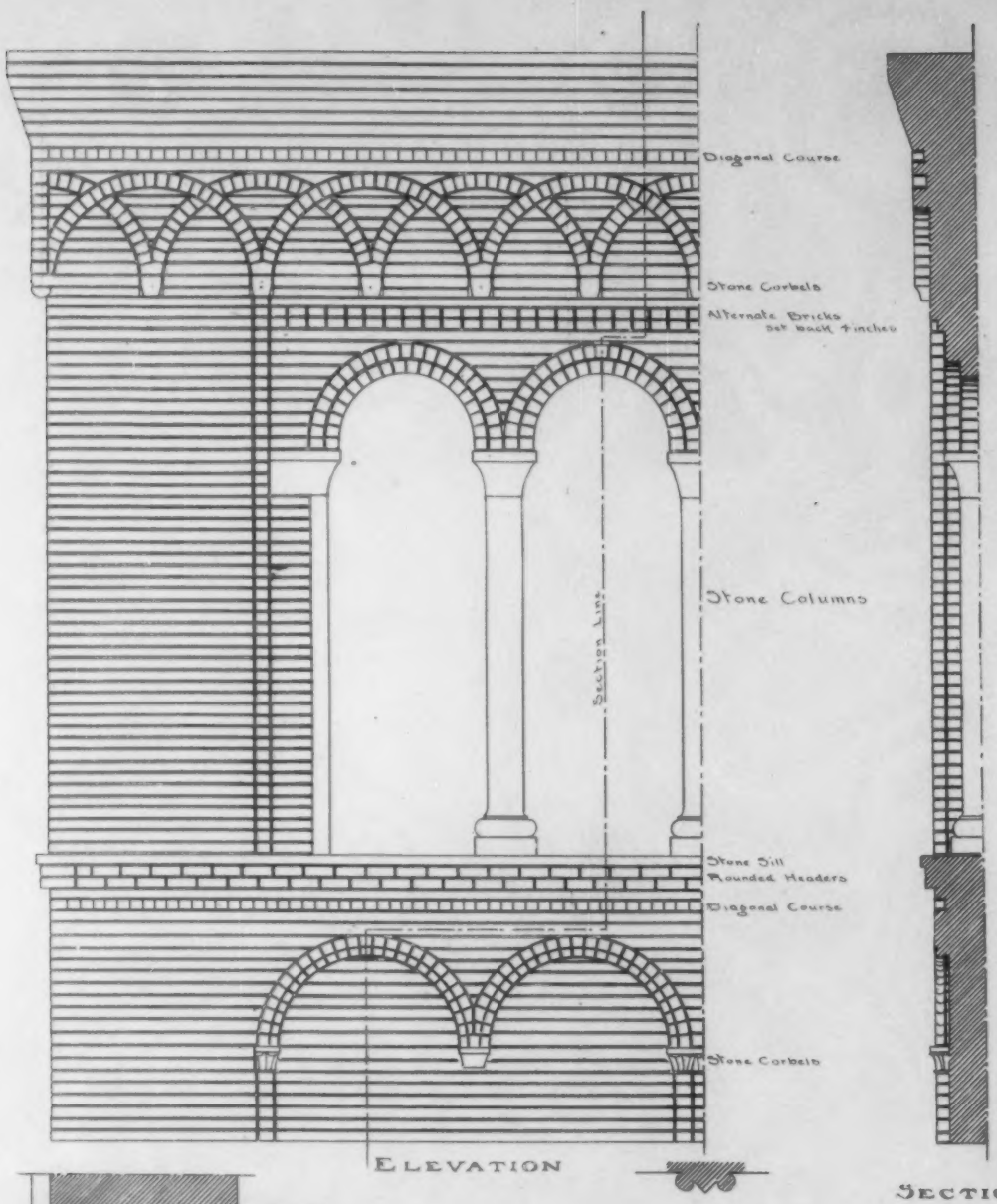


HOUSE, 47 EAST 49TH STREET, NEW YORK, N. Y.

(ENTIRE FACADE OF TERRA-COTTA.)

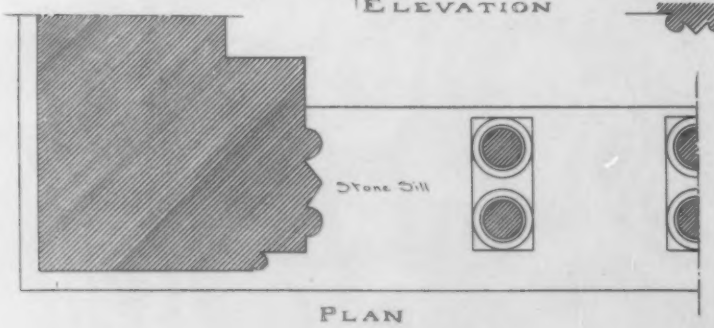
BARNEY & CHAPMAN, ARCHITECTS.

U OF M



ELEVATION

SECTION

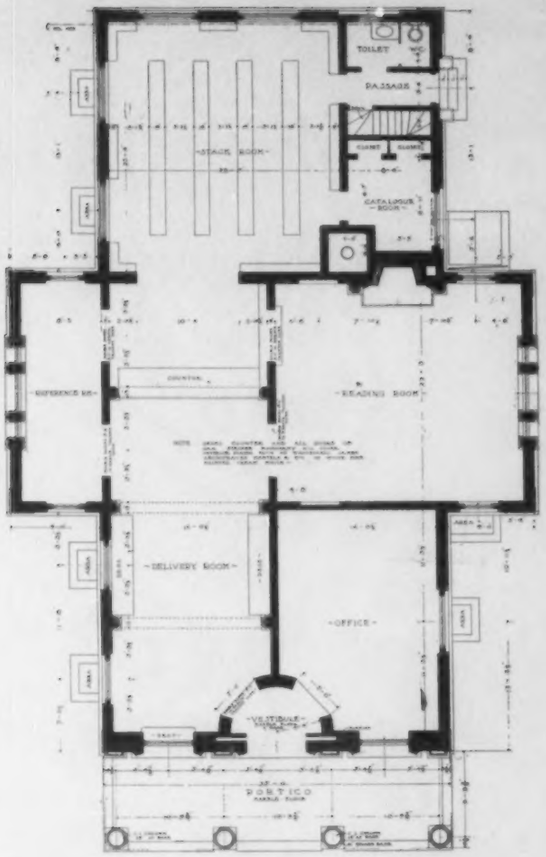


PLAN

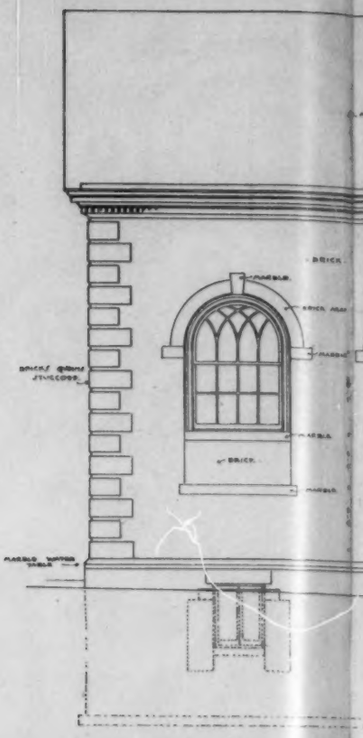
DETAIL OF CAMPANILE PIACENZA CATHEDRAL

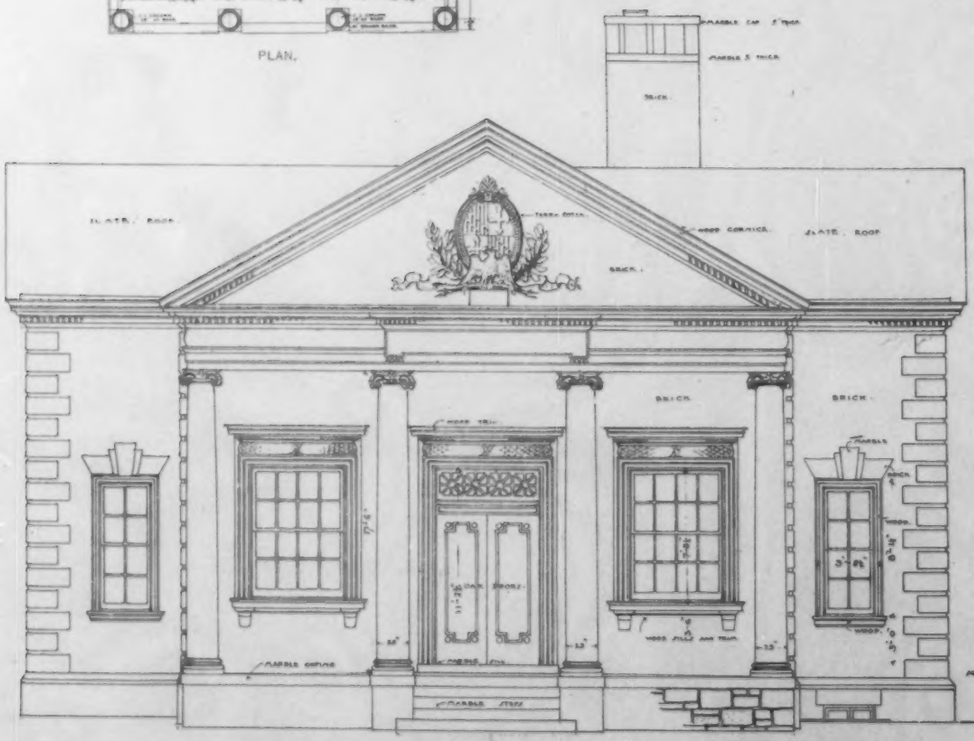
DRAWN FROM MEASUREMENTS BY C. H. ALDEN, JR.

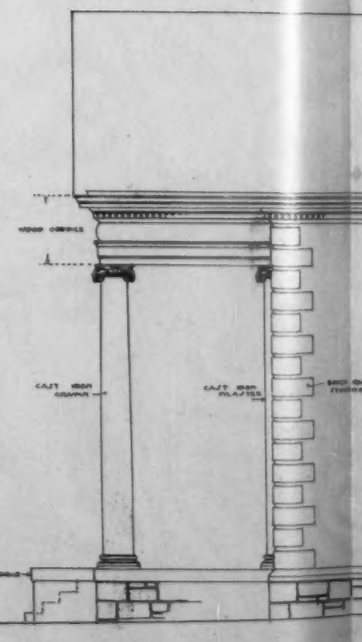
SCALE


TOILET
PASSAGE
STACK ROOM
CATALOGUE ROOM
READING ROOM
DELIVERY ROOM
OFFICE
VESTIBULE
PORTICO

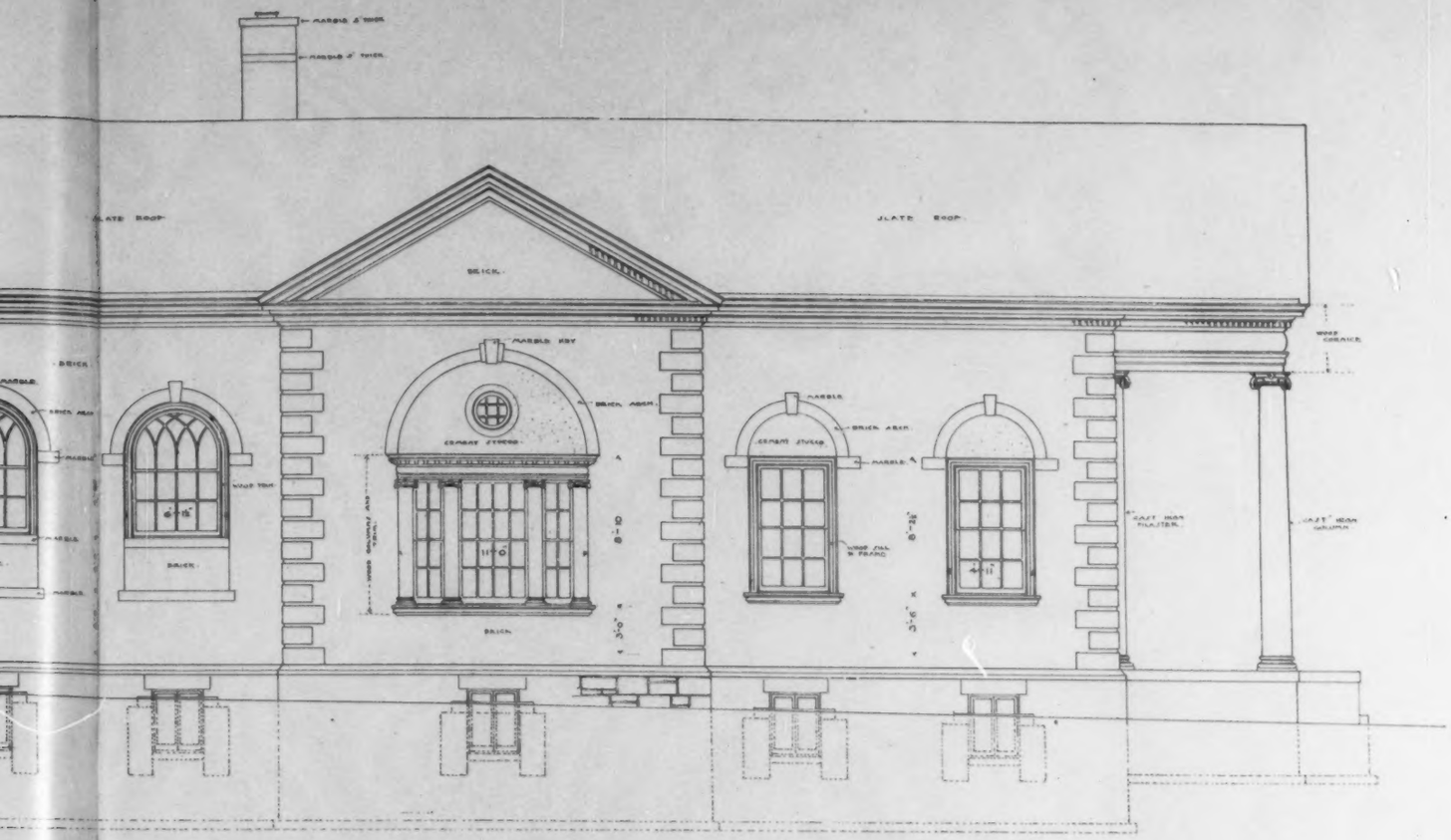
PLAN.


BRICK
MARBLE
BRICK
MARBLE

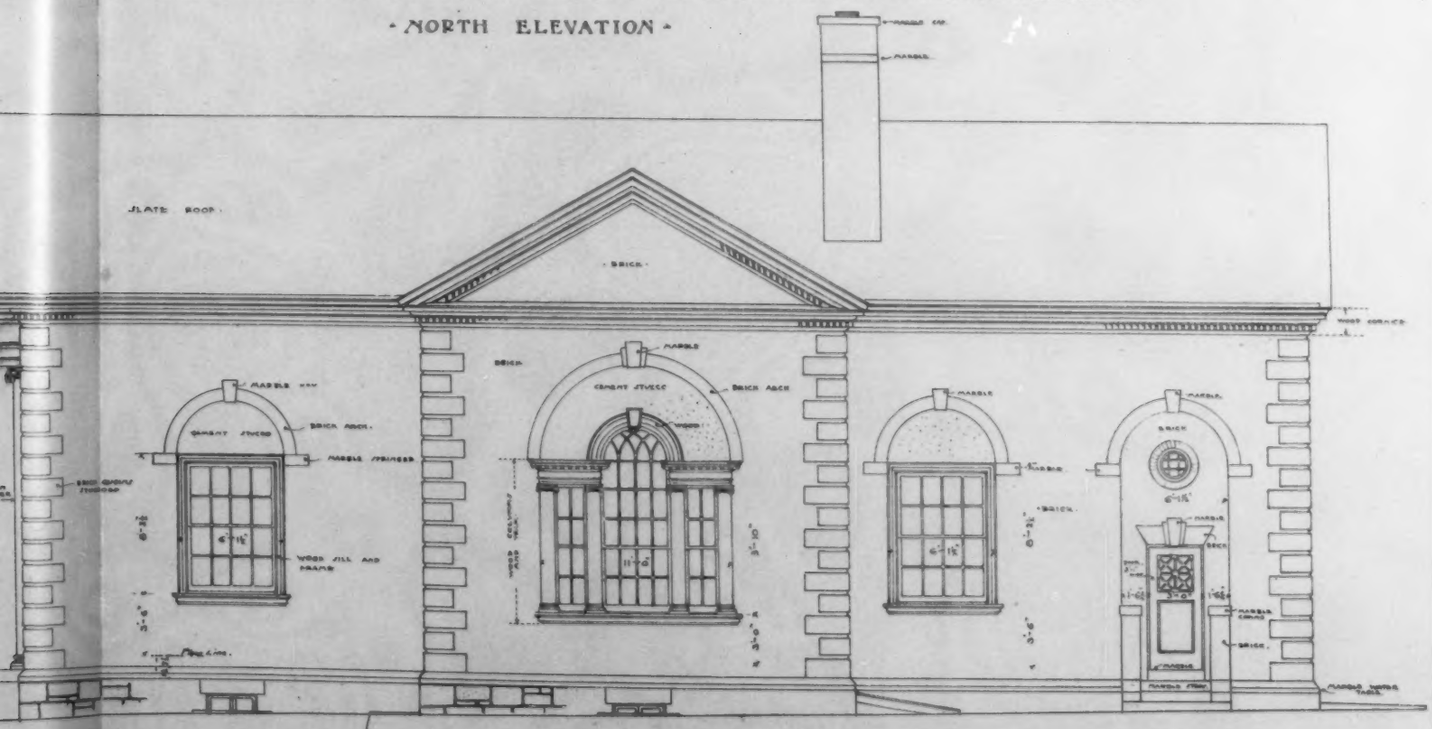

SLATE ROOF
TERRA COTTA
WOOD CORNICE
SLATE ROOF
BRICK
BRICK
MARBLE COPING
MARBLE STEP


WOOD CORNICE
CAST IRON CAPITAL
CAST IRON PILASTER

PLATES 26 and 31.



NORTH ELEVATION



EE LIBRARY, WOODBERRY, MD.

OSEPH EVANS SIBLEY, ARCHITECT.

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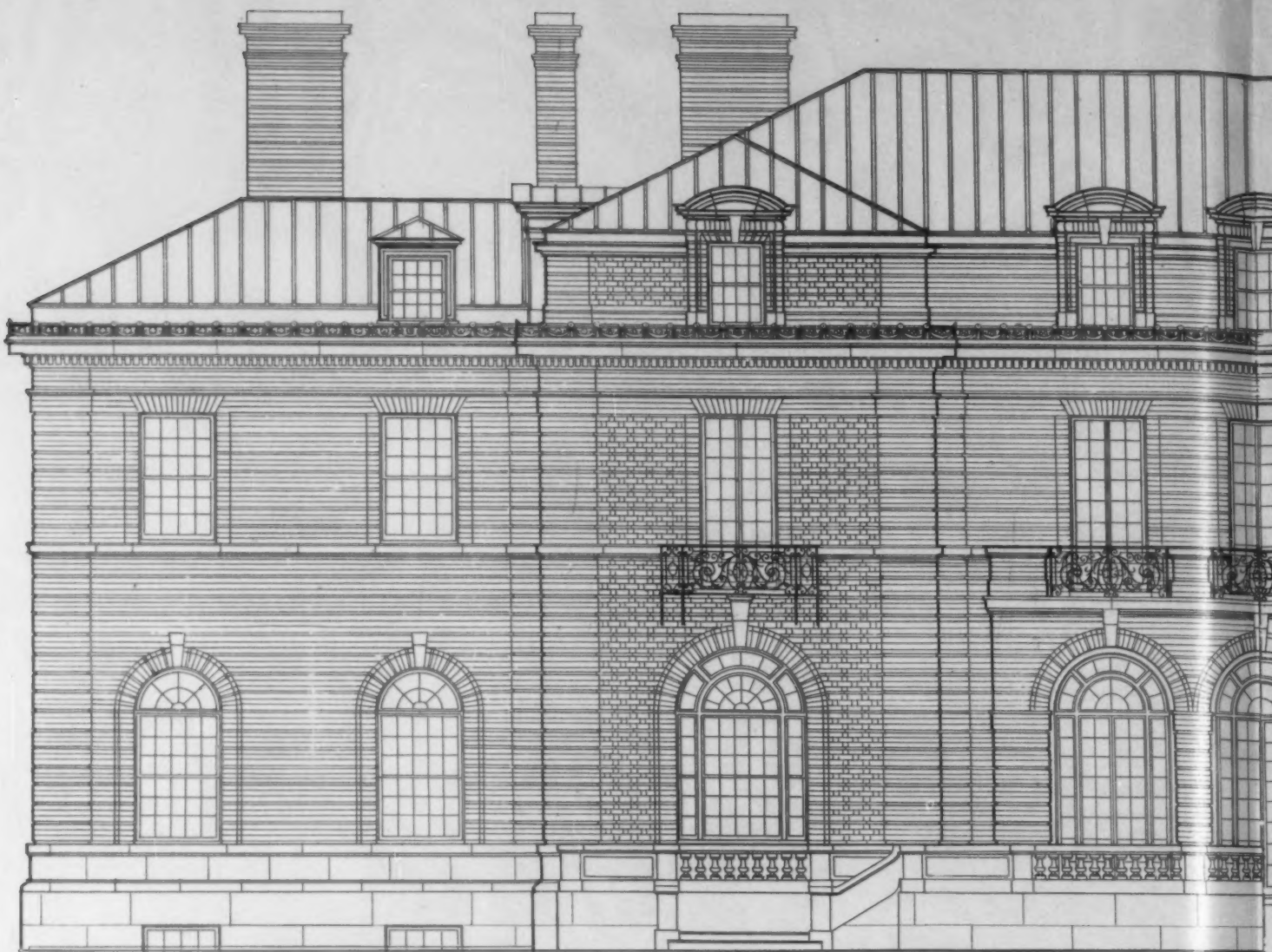
LIVINGSTON COUNTY COURT HOUSE, GENESEO, N. Y.
BRAGDON & HILLMAN, ARCHITECTS.



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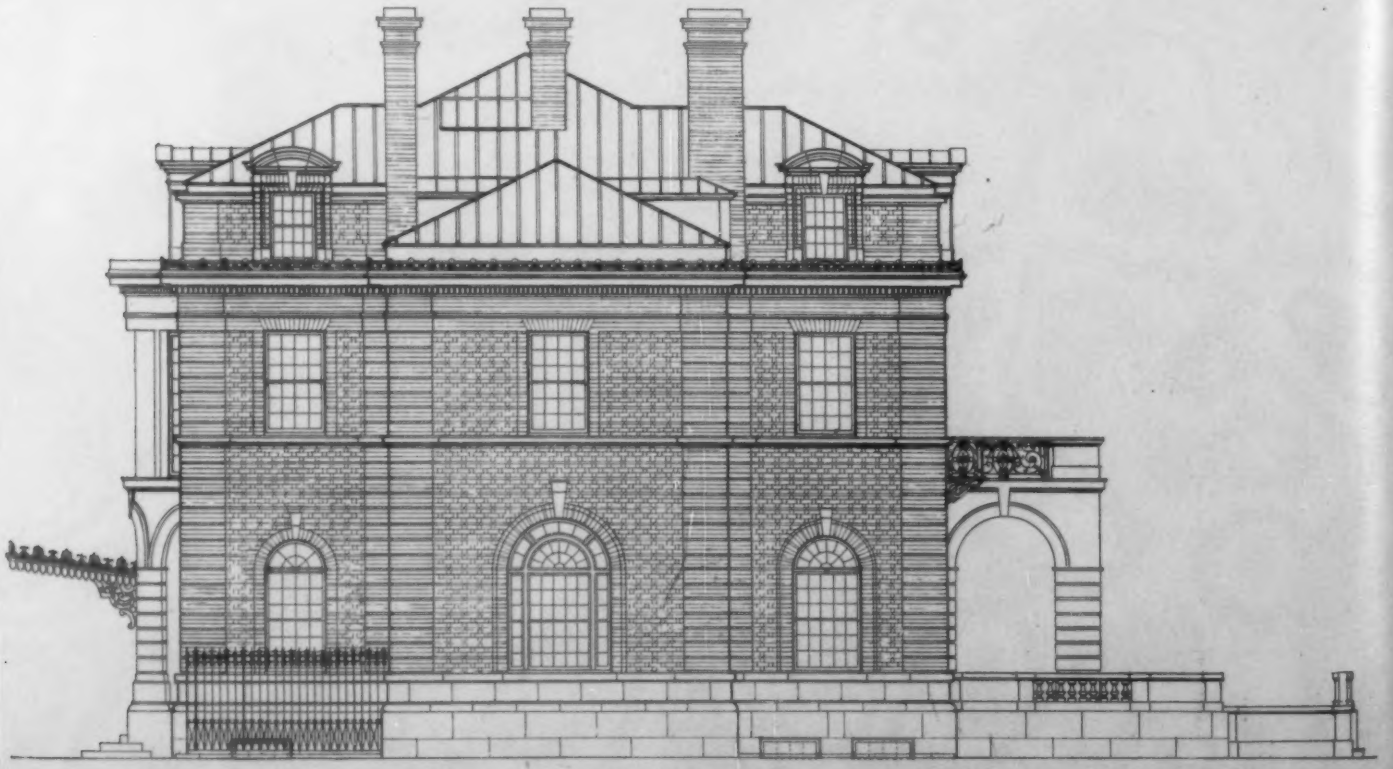
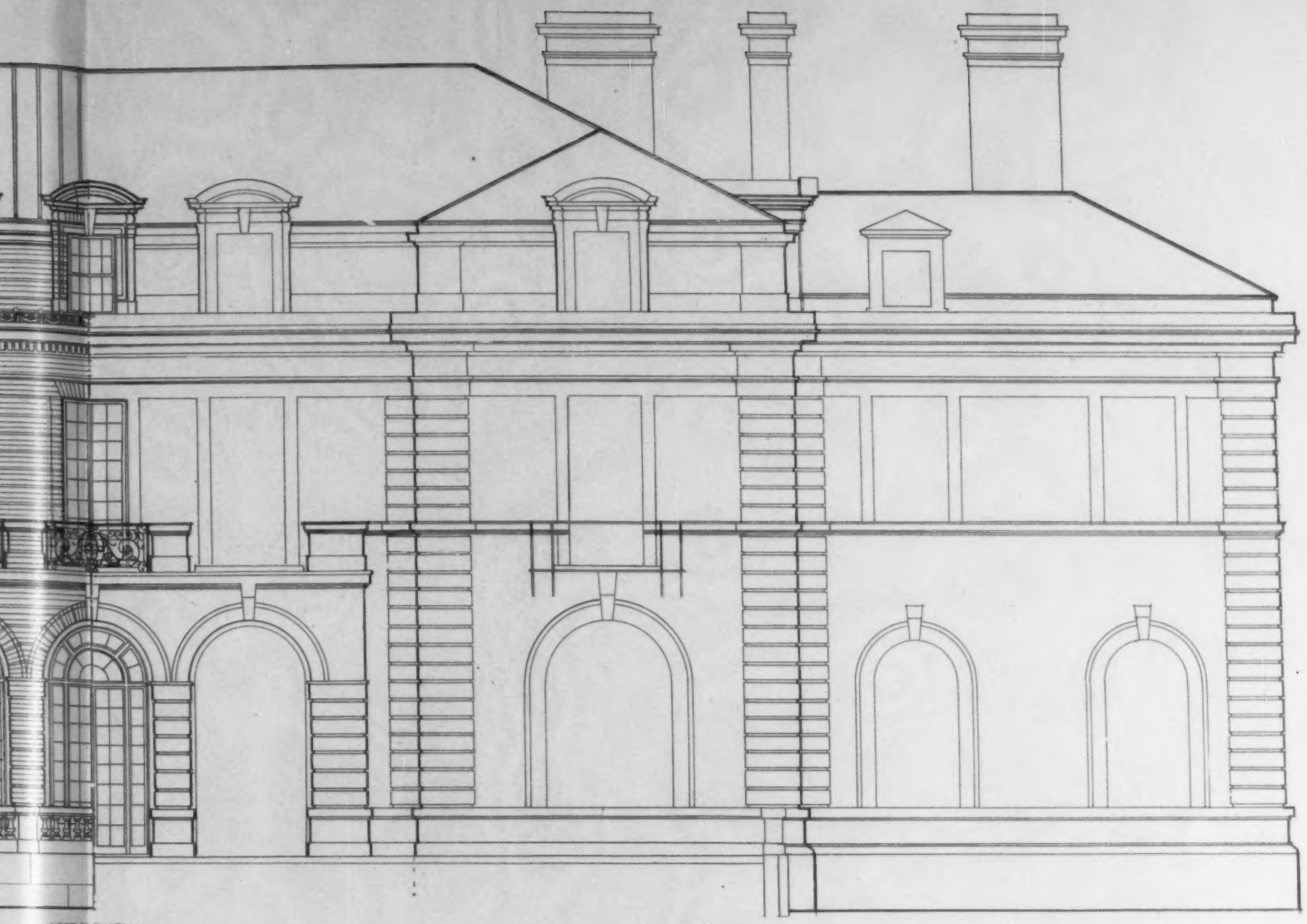


SOUTH ELEVATION.

HOUSE AT HYL
YORK & SAWYER



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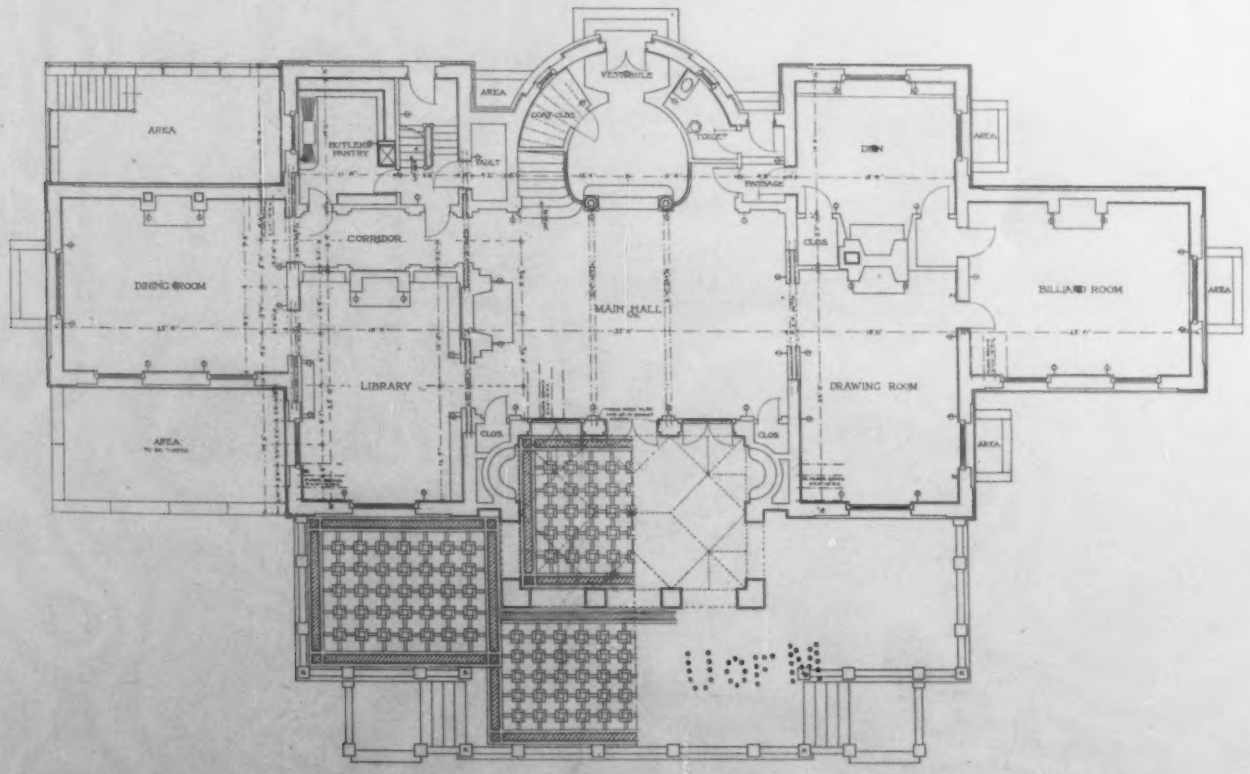

FIRST FLOOR.

SE AT HYDE PARK, N. Y.

YORK & SAWYER, ARCHITECTS.

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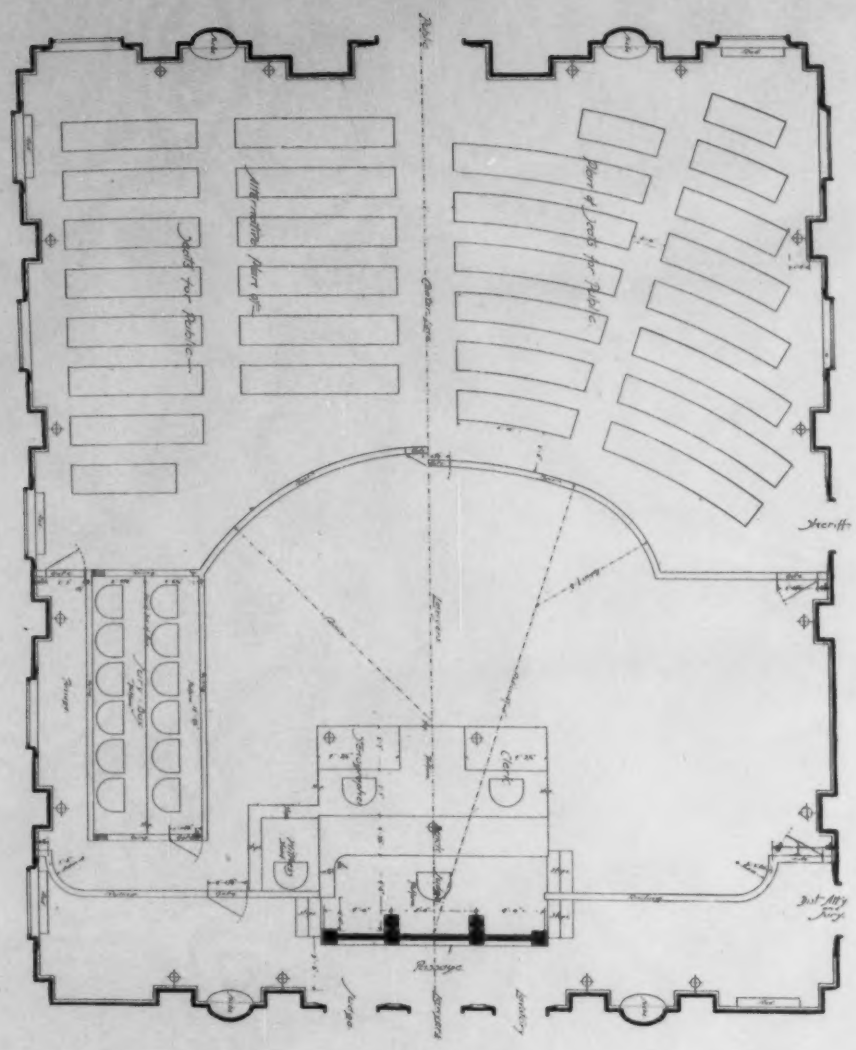
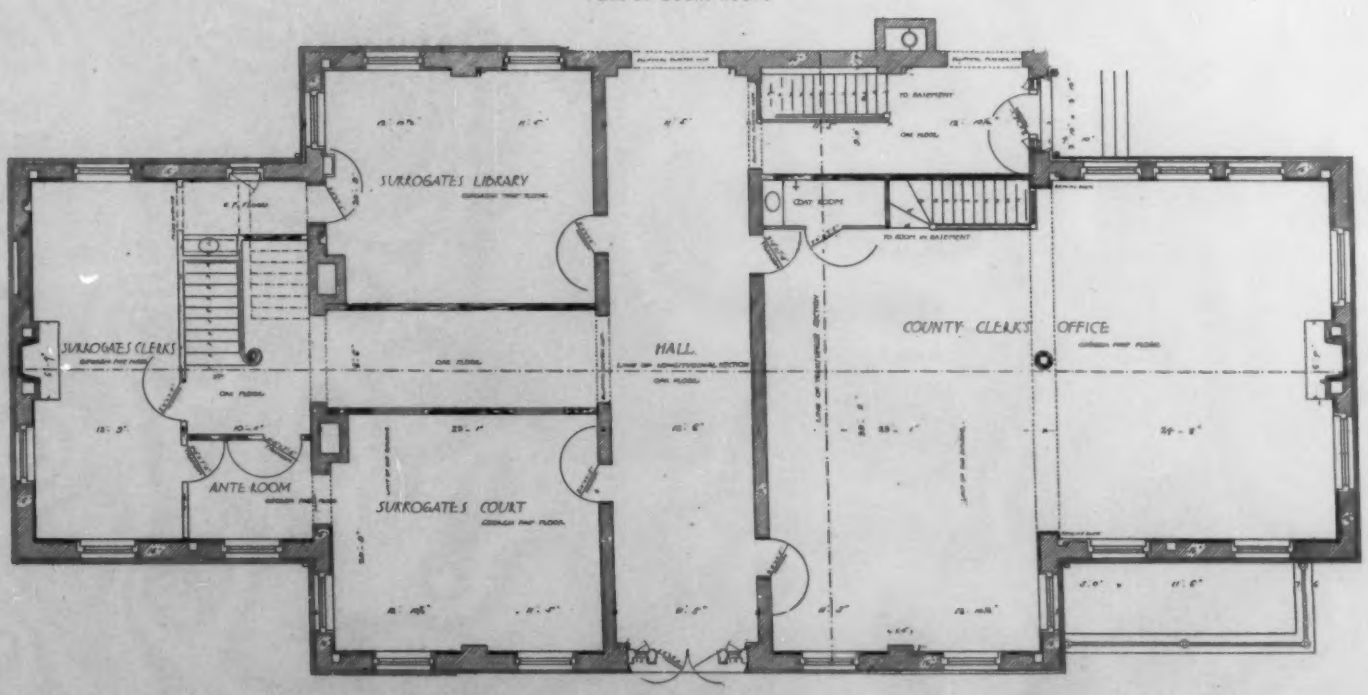


PLAN OF COURT ROOM.

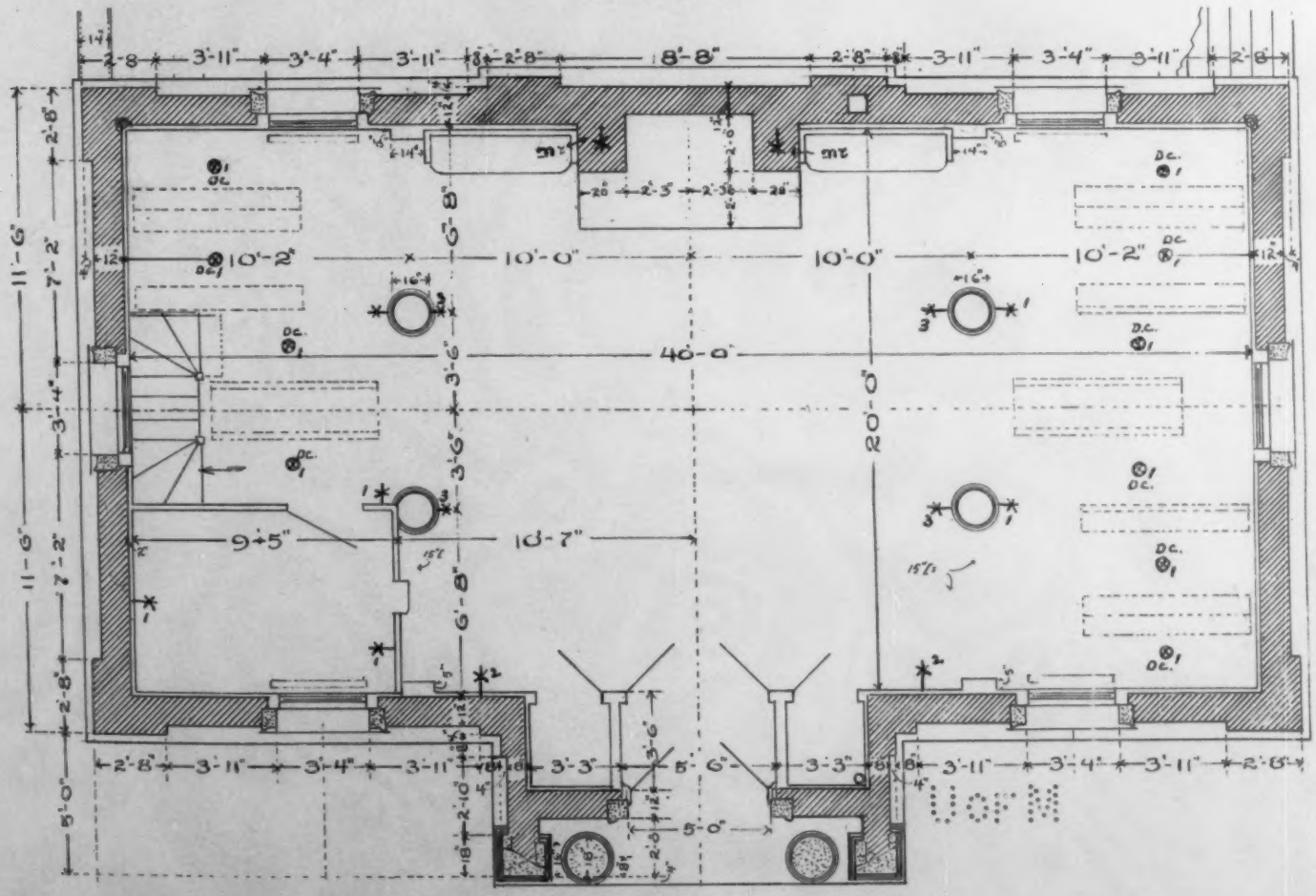


PLAN OF FIRST STORY.

LIVINGSTON COUNTY COURT HOUSE, GENESEO, N. Y.

BRAGDON & HILLMAN, ARCHITECTS.

FRONT ELEVATION.



FIRST FLOOR.

FREE LIBRARY, STONINGTON, CONN.

CLINTON & RUSSELL, ARCHITECTS.